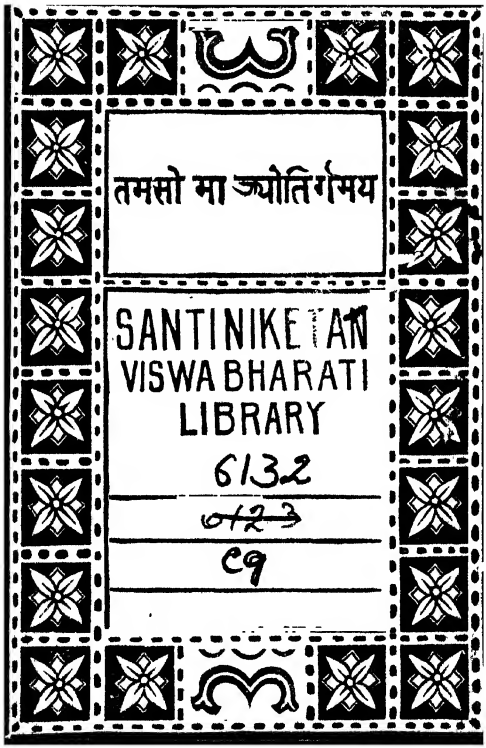
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THE CHILD'S DIET

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BY

J. SADLER CURGENVEN

M.R.C.S., L.R.C.P.

SECOND EDITION

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PREFACE

TO THE SECOND EDITION

THE first edition of this book being sold out, I have complied with the publisher's request to revise and somewhat enlarge it for a second edition.

The plan and purpose of the book remain the same, but the additional pages have allowed of fuller treatment where such seemed an advantage.

In ten years' further practice I have met with little calling for any modification of the facts stated in the Introduction, and much need still remains to instruct the public in the feeding of infants and children.

I am strongly of opinion that the science of digestion and the use of various foods for children and invalids is not sufficiently taught either to our medical students or to professional nurses, and one generally finds that the ordinary child's nurse is quite ignorant on such subjects.

I am glad to see that there is now some stir being

made as regards our milk supply, and can only hope that before long some measures may be taken by our legislators to ensure the public being able to get a purer and cleaner milk.

The importance of these matters is so frequently brought home to me in medical practice that I am induced to believe that the public will not find another edition of this book superfluous.

J. S. C.

CONTENTS

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INTRODUCTORY

My excuse for writing this little book, which I have done mostly with the idea that it may be of some use to my own patients, must be that, as the result of about twenty years' general medical practice, I am much struck with the fact that so many children, even those in the upper educated classes, are badly fed. By this I do not mean that they are half starved, but that the food they do receive is not the most suitable, nor that calculated to assist the child best in its physical and mental growth and development, added to which I do not think sufficient care is taken that the child eats its food in a proper manner, but is allowed to shovel it into the stomach very much as it pleases.

A grain of practice is worth a pound of theory, and although there has been a great deal of scientific work done on the theory of digestion, practical results are more useful, and I base my suggestions mostly upon the results I have obtained in the practical treatment of small patients. I do not mean to convey by this that my practical results are in disagreement with the scientific theory of digestion; on the contrary, as I will show, they go hand in hand.

There is a certain class of children—unfortunately, I fear, becoming more and more rare, especially in our towns—who would thrive and wax strong on any diet, who will devour and bolt large masses of heavy pudding or new doughy cake without ever a hiccough to follow; but the majority, in order to be maintained in good health, require intelligent care in the choice and preparation of their food, the number of meals, and the amount given. If this care be not given, the child soon shows signs of dyspepsia, which, unchecked, is apt to develop into catarrh of the stomach and bowels, with its accompanying bilious attacks, loss of appetite, irritability, and general debility.

Most mothers, a great many nurses, and I fear a few medical men, know very little about the physiology of digestion, even its broad lines; nor are they conversant with the amounts and varieties of foods necessary for the growth and maintenance of health in children, so that gross errors are often unwittingly committed. Especially is this so when the child is ailing or weakly, and, it being uncertain what particular food is disagreeing, haphazard changes are made, in the hopes that some other food, which possibly has suited Mrs. So-and-so's child, may here also agree; but this is nothing more than groping in the dark. My object, therefore, is to point out the general principles on which a child should be fed, and the direction in which most mistakes are made.

THE FEEDING OF INFANTS

On the subject of infant feeding much has been written, and I do not know that there is any disagreement as regards the most suitable diet, or that any further books are wanted on the subject. My intention being more to make suggestions as to the diet of children after they have passed the age of milk, I will deal briefly with the subject of the bottle- or breast-fed babe.

No one will need to be reminded that the natural food for a child, and, broadly speaking, the best until it is nine or ten months old, is its mother's milk. Cases do occur from time to time where the baby is unable to thrive even on this, but these instances are rare, and would, I venture to think, be still rarer if some little attention were paid to the mother's diet and habits. Dinner-parties and late suppers are good for neither parent nor child, and occasionally it seems necessary to put the former on a very careful regimen. In any case plenty of milk, cream, and good plain food should be taken, and too great an indulgence in fruit and all made-up and highly-seasoned dishes should

be avoided. Some mothers find they obtain an increased flow of milk if they take stout, porter, or burgundy; but I think extra milk, if well tolerated, is decidedly better.

As regards the constituents of the milk, it is generally found that the fat, or cream, is the only ingredient influenced by the diet of the mother. It is increased by taking an ordinary mixed diet freely, or by taking a larger amount of proteids—such as meat, fish, chicken, etc. It is not affected by taking an increased amount of fat or starchy and sugary foods, nor is the richness of the milk in any way improved by taking alcohol.

The milk supply seldom fails during the first month, but when the mother begins to get about, returning to her ordinary duties, it frequently shows signs of decreasing, and many a time it is then found that there is not sufficient to supply the baby's wants. In many cases this can be remedied by the parent doing less and resting more. You cannot serve two masters. A woman cannot be an efficient suckling mother and at the same time join in the duties of society. If she attempts it, the chances are the baby suffers.

The most important time in the feeding of a child is during the first six months of its life, and, in order to give it the best chance, breast-feeding should be encouraged during this period wherever it is possible. Where it is impracticable, either on account of the mother having necessary work to attend to,

or on the grounds of ill-health, what, then, is the best substitute for human milk ?

The first answer is rather like the solution of the problem, 'What is most like a cat looking out of a window ?' 'A cat looking in.' So the best substitute for the mother's milk is some other mother's milk—*i.e.*, a wet nurse. There is here, of course, a difficulty in finding a suitable one—an expense and a certain amount of risk by contamination from an unhealthy woman—but undoubtedly many children's lives have been saved by this means. If this course is resolved upon, it is important that the child of the foster-parent should be much the same age as the child to be nursed, and that the woman should be in a condition of good health. To ascertain this latter she should be examined by a medical man.

When we discuss the subject of the bottle-fed baby, we are met with many difficulties. That which is a good food for one child may be poison for another, and it resolves itself into a species of experiment to determine what a certain baby will thrive on. This experiment, however, must be conducted on a scientific basis. It is worse than useless changing about from one form of food to another, with no knowledge of what is required, or what may be disagreeing with the child. The chances are that if this is done, the baby will rapidly drift from bad to worse, and in the end be able to digest little or nothing.

To rear a healthy infant some knowledge must be had of the proportions of the different constituents of its food. These can be ascertained by the analysis of human milk, and we know them to be roughly as follows:

Proteids	3
Fats	3
Carbohydrates (sugar-of-milk) ..	6
Salts	2
Water	86
	100

Any food, therefore, given to an infant should be based on this composition. The most common substitute for human milk is cow's milk, but on examination it is found that this is too rich in proteids, and poor in carbohydrates, and by experience that it forms too hard and indigestible a curd in the child's stomach. Children fed on cow's milk frequently vomit hard cheesy curds, and pass the same, only partially digested, in their motions. It can, however, be so far modified as to become a very good food, and one that can be digested by all except the most delicate.

During the first month of infant life one part of milk to two of water is the dilution usually best borne, but it is frequently advisable at first to begin with a dilution of one to three. This, however, is deficient both in fat and carbohydrates, so that it is necessary to add a little extra cream and sugar-

of-milk,[1] a small teaspoonful of the former and half as much of the latter. Besides these, the digestibility of the milk is much aided by adding 1 grain of citrate of soda[2] to each ounce—this being what is known as "citrated milk"—or, as alternative, a little lime-water or bicarbonate of soda—two teaspoonfuls of the former to the bottle, or a good pinch of the latter—or the diluting water may be replaced by barley-water. Another substance which, added to cow's milk, seems to aid its digestion very considerably, and is also in itself a nutriment, is albulactin. I have known babies thrive admirably on a mixture of this with cow's milk when they have been quite unable to digest the milk alone. The reason for these additions is to render the curd of the milk, which is formed in the child's stomach, softer and more easily digested. Directly milk enters the human stomach and comes in contact with the gastric juice, the casein is acted on by a rennet, which coagulates it. This curd when formed from human milk is much lighter, and therefore more easily digested, than that formed from cow's milk. The effect of the citrate of soda, lime-water, bicarbonate of soda, or barley-water, is to so modify the curd that instead of a hard cheesy

[1] Sugar-of-milk, which can be procured from any chemist and most grocers, is the sugar prepared from milk; it has less sweetening power than ordinary sugar, but is more easily digested.

[2] Tabloids of citrate of soda, containing either 2 or 5 grains of the salt, can be obtained from any chemist.

mass, a much lighter and more flocculent one is formed.

A very good diluent for infants' milk is that recommended by Dr. Chapin of New York.[1] This consists of digested or malted gruel. The gruel can be made from either wheat, barley, oatmeal, or rice, and the starch in it is then dextrinized by means of malt-extract. This makes a soluble food, has no free starch to ferment, and has the desired effect of softening and breaking up the milk-curd. When a child who is taking barley-water and milk suffers much from flatulence, a change to the dextrinized gruel should be tried. (For mode of making the gruel, see recipes.)

When a child is sick, the milk which it brings up is found to be curdled, even although it may not have been in the stomach for more than a few minutes, and from the fact of its being so, nurses and mothers will often think that the milk has disagreed with the child. 'It turned sour on its stomach,' is an expression one has so often heard. It may have disagreed, and most likely did, as the child vomited it, but not necessarily because it was curdled. The first process of digestion when milk enters the stomach is for it to be converted into a junket by means of a rennet contained in the gastric juice; it then becomes the business of the stomach to digest this curdled fluid.

The cow's milk and water, or barley-water,

[1] *Med. Ann.*, 1903.

should both be sterilized or boiled, and if barley-water be used, it should be made at least twice in the twenty-four hours. Undoubtedly, if milk can be properly sterilized without raising it to the temperature of boiling-point, so much the better for the milk and the child; but as this requires a proper apparatus and care in the preparation, it cannot be carried out in all households, under which circumstances ordinary boiling must be resorted to.

To sterilize milk it should be heated to a temperature of 150° F. and maintained at that heat for about twenty minutes, for which purpose there are various apparatus sold, one of the best being Soxhlet's Milk Sterilizer, to be obtained for about a sovereign at most instrument-makers, and which sterilizes all the milk required for the twenty-four hours, at one heating. In most towns milk ready sterilized in bottles can be procured from the chief dairies.

The nutrient value of milk is undoubtedly altered by boiling. There still exists some uncertainty as to the exact nature of the changes which take place, but the following are amongst those which are generally brought forward: the soluble albumen is coagulated, rendering it less digestible; the fat globules coalesce, the emulsion therefore not being so complete; some change occurs in the casein, so that the rennet ferment in the stomach is not able to act upon it so readily; some alterations as to solubility take place also in the salts of lime and magnesia.

I have performed some laboratory experiments on the digestibility of boiled and unboiled cow's milk published in the *British Medical Journal* (April 29, 1905, p. 969), which point very strongly to the fact that boiled milk is easier of digestion than unboiled.

In the first instance, when rennet is added, the curd is harder and more rapidly formed in the raw milk, and when put in an incubator, mixed with an artificial gastric juice, the solid constituents of the boiled milk are always more rapidly digested than those of the unboiled. I am aware that digestion in a test-tube cannot be accepted as a clear indication of what takes place in the human stomach, but I think it may be looked upon as rather more than proving that the digestibility of milk is not interfered with by boiling.

Another point to be considered in boiling milk is the fear of impairing or destroying a certain ill-understood vital principle, without which a child will tend to develop scurvy, or scurvy-rickets. I think the risk of this is small if milk is used which has only just been brought to the boiling-point, but it is well to guard against it by giving the child daily either a little raw meat-juice, or the juice of orange, grape, or other fruit. More will be said of this when treating of predigested foods.

Most children and a good many adults have the greatest horror of what is generally called 'skim' in milk. I have seen a child positively refuse to take another taste of milk after it has had a small

piece in its mouth. This 'skim' is formed by the drying of some of the casein on the surface of hot milk, and the longer the milk is allowed to stand whilst warm, the thicker and tougher will be the coating of 'skim.'

This can be entirely avoided if, directly the milk has been brought to the boil, it is put in a jug and stood either on ice, or in running water, so as to cool it down rapidly, stirring it or keeping it shaken until cold. It can then be rewarmed as it is wanted, but should never be allowed to stand when warm.

So far as cleanliness is concerned, the milk supply of our cities is very bad, and is greatly in need of reform. There are, I believe, some farms in which a degree of cleanliness is observed, both in the housing of the cows and in the milking operations; the cow-houses are properly cleansed and disinfected; the milker wears a washable overall, and is careful to thoroughly wash his hands before milking, and the cow's teats and udders are also cleansed; all utensils are scalded out or boiled, and every precaution taken that no dirt or foreign matter should get into the milk; but these model farms are, I am afraid, the exception rather than the rule, and it is difficult to expect the ordinary farm-hand to appreciate the necessity for what one might almost call surgical cleanliness. On the average farm the cows live in dirty houses, opening on to a ten times filthier yard, reeking of dung that frequently lies inches thick there; the cow, which is, unfortu-

nately, rather a dirty animal, is generally much splashed with its own droppings, and the milker, although he may wear some form of smock or overall, and may give his hands a perfunctory wash at the pump, is far from being really clean. Further than this, milking in bad weather is done in the dirty cowshed, and in fine in the still dirtier yard, and one can then very well imagine on a windy day the amount of dirt, composed mostly of pulverized manure that will find its way into the milk. The milking over, all the milk to be sent to the towns is put into large cans, containing many gallons, generally with ill-fitting lids—lids that will allow some of the milk to slop out during movement and then run back, carrying accumulated dirt from the outside. These cans are driven in open carts to the rail; they stand, perhaps, for some time in the station, with dust-raising express trains rushing through, and then, on reaching town, are again driven in open carts through our very insanitary streets. Arrived at the dairy of distribution, some of this polluted fluid is then put into nicely-washed bottles, sealed up, *dirt and all*, and sent out to the poor unsuspecting public as the most suitable food for infants and the sick. Consider with all this that milk, especially in warm weather, is one of the best mediums for the growth of germs, and without sterilizing it, can one honestly advise a mother to give it to an infant of a few weeks old? The number of bacteria found in London milk is

disgracefully high. I can quote from a letter in *The Times* (March, 1914), in which the writer states that he procured milk from about nine of the leading dairies in London, and on careful examination, these were found to contain from 220,000 to 28,700,000 bacteria per c.c. In what one might call 'clean milk' the number should not exceed 10,000 per c.c.

In the United States they are far ahead of us. They have a Milk Commission of the State Medical Association, which issues a monthly certificate to those dairymen who comply with their requirements. The cows are examined, and must be all free from tuberculosis; the dairy hands must be in a state of good health; the premises must be clean; the milking done under satisfactory conditions; and the milk *must be bottled on the farm.* Besides this, a bottle of milk is then taken at the point of distribution, is examined chemically, and the number of bacteria it contains counted—this must not exceed 10,000 per c.c.—it being found that the count of bacteria is the only practical method of estimating the amount of dirt in the milk. Compare this 10,000 with the worst of the London milk containing 28,000,000; the latter is 2,800 times as dirty as the former. This clean milk of the United States is called 'certified milk,' and besides that, they have another grade called 'inspected milk.' This, too, must come from tubercle-free cows, and must not contain more than 60,000 bacteria per c.c. This

latter need not be boiled at the farm, but, to make it cheaper, it may be shipped in churns. To make our milk-supply tolerably clean, therefore, and fit food particularly for infants and invalids, what is wanted is—(1) that the farms, byres, cattle, and milkers should be really clean; (2) that the cattle and farm-hands should be medically inspected and passed as sound; (3) that the milk, as soon as it is taken from the cow, should be cooled down and put direct into bottles and sealed. This would, of course, entail extra expense, especially in the matter of railway carriage; but there can be no doubt that an enlightened public, especially in the case of invalids and for children, would willingly pay a higher price if only they were given the chance of procuring a cleaner milk.

So far I have only spoken of the contamination of milk by dirt, but besides this there is the danger of tuberculosis and such infectious diseases as scarlet fever and diphtheria, for which milk is an excellent conveyance. The amount of tubercular disease amongst cows is very large—less now, fortunately, than it was some years ago, but still, I believe, very considerable, and in many cases, except by a proper veterinary test, very difficult to find out, so that it is a very common thing for a farmer, quite unknowingly, to keep a sick animal amongst his milking herd, and so, by mixing the milk, contaminate the whole. Taking all these points into consideration, I think one may say that

it is unwise for anyone to drink unboiled milk in our large cities, and positively dangerous to give it to invalids and children.

If milk and barley-water cannot be digested, it is well to try humanized milk. This is now made by most large dairies in our towns, and as it is sterilized, and put up in bottles, it will keep sweet for an almost indefinite period, and can therefore be sent, in cases of a dozen or more bottles, into the country. It is made from cow's milk, its composition being very near that of human milk. A certain quantity of fresh cow's milk is divided into two equal portions. From one the cream is separated, after which the casein, or curd, is coagulated by means of rennet. The whey, which is strained from this, together with the cream, is then added to the other unaltered portion of the milk, and also a little extra sugar of milk. After making this it is sterilized, when it is ready for the bottle, and requires no diluting.[1] By this method we halve the amount of casein, and give the full amount of fat, carbohydrates and salts. As in cow's milk there is almost double the amount of casein there is in human milk (4·3 per cent. to 2·3 per cent.), the proportion will be pretty correct. In the case of fat there is an excess in cow's milk (3·4 per cent. to 2·4 per cent.), so that if the full amount of cream be added, the child will be taking more than it would in human milk. As a rule there

[1] For mode of making, see recipes at end of book.

is no disadvantage in this, rather an advantage; but if there are signs of the fat not being all digested, by some of it appearing in the motions, part of the cream can be withheld. The carbohydrates are rather low in cow's milk—4·4 per cent., compared to 6·3 per cent. in human. To make up for this deficiency, therefore, it is necessary to add the sugar of milk.

Most of the dairies supply humanized milk in two strengths—one strength for infants during their first two or three months, and one for those of from two to three months and onwards.

If the milk be prepared at home—and any careful, sensible nurse should be quite competent to undertake it—its different components can be varied to a nicety. If less casein is required, the curd is removed from rather more than half the milk; if a milk stronger in the proteid, then less than half must be curdled. The cream and sugar of milk can obviously be easily varied as is found necessary.

Some children do exceedingly well on this, and if it is procured from a dairy it has the advantage of being ready for use, requiring no mixing, preparing, or cooking, only having to be warmed, measured, and put in the bottle.

A milk which approximates much nearer to human than cow's milk is that from the ass—not very complimentary to the ladies, but there it is. Many children have been successfully brought up on this, but it is often difficult to procure, and is expensive. For the London supply Messrs. Welford keep a

herd of asses, but in most parts I think it would be difficult or impossible to get.

A form of milk which is now little used for infants is condensed milk, and although undoubtedly at times it has been found a very useful food, it is not a good one on which to rear infants.

Condensed milk is made by evaporating milk until it becomes of the consistency of cream, then adding a large quantity of sugar to it. It is often well tolerated by infants, and unquestionably thirty or forty years ago, before the introduction of humanized milk, and many other of the infant foods, it was a very useful one to fall back upon when cow's milk did not agree. But it contains a great deal too much carbohydrate in the form of sugar, so that children brought up on it generally become large, white, flabby, and very prone to attacks of bronchitis.

It is a useful food for travelling, its bulk being so very much less than that of sterilized milk, and it is easily prepared. If it be given it should be much diluted at first—about 1 part to 20 parts of water, the strength of this being as soon as possible, but gradually, increased to 1 in 10, or even 1 in 7, the strength generally recommended on the label. If the full strength is commenced with, disaster will generally result.

Of 'foods for infants,' their name is legion, and some are most useful, either as substitutes for, or additions to, cow's milk.

One cardinal rule must always be borne in mind. *No unaltered starch must be given to infants until the time of teething*, and I should like to see this writ large in every nursery. Therefore all farinaceous or starchy foods may be dismissed at once as being unsuitable for infants. The commonest cause of infantile diarrhœa and English cholera in babies, leading to so many, many deaths in the lower classes, is the fermentation of, and consequent poisoning by, starch. It is a frequent occurrence for them to be given sopped bread, potato, cornflour, and such-like food, for the digestion of which their poor little insides are not equipped.

Roughly, the patent and prepared foods for infants can be divided into three classes, which, however, in some cases merge one into another:

1. Foods consisting of desiccated or dried milk, with or without the addition of malted starch.

2. Foods consisting of starch which has been completely dextrinized and rendered soluble, in which there remains no unaltered starch.

3. Foods containing partially or wholly unaltered starch.[1]

I append a list of a number of foods under these three headings, all of which I have myself tested to ascertain the presence or absence of free starch.

For infants under six months of age the only foods permissible are such as can be classified under headings 1 or 2, they being free of all unaltered

[1] See page 81.

starch. I am ready to admit that some babies reared on the starchy foods thrive, and thrive well, when with the food plenty of fresh milk is given; for these foods, although indigestible in themselves, render cow's milk more easily digested, by mechanically breaking up and softening the curd. But an unnecessary risk is being run: the starch is likely to ferment, form lactic acid, and so derange the child's digestion, with the consequent sickness, diarrhœa, and malnutrition. Starch in the form of barley-water seems the most harmless and least likely to upset small children, and, as I have mentioned above, it has a very decided effect in making the milk-curd softer and more flocculent; but even here it is sometimes better to give plain boiled water, with the addition of citrate of soda, lime-water, or bicarbonate of soda, or malted gruel, in which the free starch has been made soluble. In all cases when used for infants, the barley-water should be well boiled, to split up the starch and aid its digestibility.

If a food is tried, I think a desiccated milk, like Allenbury's No. 1, or Glaxo, is about the best to start with for very young babies, and this can generally be augmented as the child gets older either by some cow's milk, which is far and away the best, or by the addition of one of the malted foods to it.

There is another class of foods which I have not included in the preceding, as I consider they stand

somewhat alone. I refer to peptonized or pancreatized foods, of which the best examples are peptonized milk and Benger's Food. And here let me at once say, and say it with emphasis: *No child should be brought up on one of these foods.* The danger is twofold. In the first instance, when a child is given a predigested food, there is little or nothing left for its stomach to do, and, like any other organ in the body, when unused, it will fail in its development, and tend to degenerate. Secondly, there is great fear of scurvy, or scurvy-rickets. Most fresh foods, as meat, milk, fruit, and vegetables, contain some vital principle, the character of which is not well understood, without which human beings, whether babies or adults, sooner or later develop scurvy. As is well known, it used to be a very common illness on sailing-ships going long voyages, perhaps not touching land for months, the sailors living during that time on salted meat and biscuits. Again, on Polar expeditions, when only preserved and dried foods could be obtained, it was a common cause of illness and death. I may quote as an instance, during the Seven Years' War, only 1,512 sailors and marines were killed in the naval battles, but over 130,000 died of disease, or were missing, and scurvy was the principal disease.

So in the case of babies fed on foods that have undergone much preparation, or milk that has been thoroughly peptonized, or pancreatized, and even

sometimes on cow's milk that has been thoroughly boiled, we may get cases of scurvy. I have myself seen cases in children fed exclusively on a pancreatized food, and a good many are on record. The child gets white (anæmic) and flabby; its gums become swollen, spongy, and easily bleed; it develops tenderness of its bones, especially the long bones of the legs, so that it screams with pain when moved or handled; and there is a tendency to get large bruise-marks on the skin, due to subcutaneous hæmorrhages. This disease is easily prevented by giving a little orange, grape, or meat juice, and I am glad to find that this is suggested in the directions supplied with some of the proprietary foods.

The predigested foods are most useful on some occasions, and at no time more so than when the child's digestion is deranged. A baby suffering from an acute attack of diarrhœa and sickness will often do splendidly if, for a short period of rest, it be put on small quantities of thoroughly peptonized milk. As the child improves the amount of food can be increased, the milk being properly diluted according to its age, until the natural quantities are being taken, and then the peptonizing process can be gradually decreased, or unpeptonized milk, or some food, gradually substituted.

A child will sometimes appear to be doing so well on its peptonized food, that its mother or nurse hesitates to change it back to a food more difficult of digestion, but she is living in a veritable fool's

paradise. The baby's digestion will fail to develop, and sooner or later signs of scurvy will surely appear.

Most of the prepared foods are deficient in fats; it is therefore advisable to add a small teaspoonful of fresh cream to each bottle. I am always rather afraid of London cream, and fear there is very little sold that has not had preservatives in some form added to it, and these substances are not at all good for a baby's inside. Over and over again I have found that infants have had their digestions upset when ordinary dairy cream has been added to their bottles. I therefore now advise nurses to get in an extra half-pint of milk, allow it to stand in a cool place, covered by muslin, for a few hours, and then to skim off the cream. I suppose one can hardly blame the dairyman, as cream is an expensive article, and if any quantity of it sours, it means a big loss; but for the sake of the babies one could wish for a pure supply. I remember on one occasion being told by a lady of some cream in a little brown jug which had been put by and forgotten for a fortnight, and at the end of that time was found perfectly sweet. This cannot have been cream as Nature ordered it.

Fat is a *most* important constituent of children's food. It enters into the formation of nearly all the cells of the body, and very largely into the composition of the brain, and other parts of the nervous system, besides being necessary for main-

taining the warmth of the body by its combustion in the tissues. It is pretty well proved that a diet deficient in fat is one of the chief causes of rickets. Dr. Cheadle, in his book on 'The Artificial Feeding of Infants,' records the interesting case of the young lions at the Zoological Gardens, who, being brought up on lean meat, developed rickets, and died. The same thing occurred with the young bears, who were fed upon biscuits and rice, the food in both cases being deficient in fat and the phosphatic salts. A litter of lion cubs, which, being fed in the usual way, were beginning to show signs of rickets—one, indeed, dying of the illness—were, in addition to their meat, given milk, cod-liver-oil, and pounded bones, when a most marked change took place: they rapidly lost all signs of their rickety condition, and, although every other condition remained the same, they grew up into strong, healthy animals.

Dr. Eustace Smith has suggested that cases are not infrequently met with where it is advisable to vary the food given, and undoubtedly some babies do seem to thrive well on this plan; they take a varied diet with more relish than a monotonous one, and digest it better.

The menu should be something of this sort:

No. 1 bottle—humanized milk.
No. 2 bottle—Mellin's Food, made with milk and water.
No. 3 bottle—whey, raw meat-juice and sugar.

The bottles are given alternately, and, if necessary, can be changed from time to time.

It is a plan well worth a trial if a child is not thriving on a single food.

When a child being fed upon a milk food becomes upset, vomiting, and suffering from diarrhœa, it is often necessary to stop all milk in its diet. One of the following foods may then be found useful for a time, to be used only until the acute symptoms have subsided, to get the child, as it were, over the stile:

1. Bread-jelly, as recommended by Dr. Churchill of Dublin, and mentioned by Dr. Cheadle in 'Artificial Feeding and Food Disorders of Infants.'
2. Albumen-water, made with white of egg.
3. Whey and meat-juice.

Bread-jelly (for the preparation of which see recipes) should be prepared fresh at least twice a day. It should never be used except as a temporary food, and a good mode of procedure is to gradually add boiled milk to it, beginning with only one teaspoonful, and increasing it carefully as it is found to be assimilated. If the child shows intolerance of cow's milk, meat-juice or peptonized milk may be substituted.

Albumen-water is simply white of egg mixed with boiled water, which must be cold or warm, not hot: for the proportions, see recipes. There is a good deal of nourishment in this, it is easy of digestion, and very unirritating; but, like the bread-jelly, it

is not a complete food, and therefore not suitable for prolonged use. In the same way milk can be gradually added to it. For a child three or four weeks old suffering from sickness or diarrhœa, two or three tablespoonfuls may be given every hour and a half, or, if necessary, smaller quantities more frequently; it can with advantage be flavoured with a little white sugar.

The third food, whey and meat-juice, is perhaps the most useful of the three, and if cream and a little sugar-of-milk are added to it, it forms a complete food, and can be given to a child for almost an indefinite time without harm. The whey contains the salts and carbohydrates of the milk, together with the soluble albumens and some of the fat; the meat-juice replaces the casein of the milk, and the proportion of fat can be made up by the addition of cream. However, in cases of illness when digestion and assimilation are defective, the food for a time must be weak, so that only a small quantity of meat-juice should be added, and perhaps no, or very little, cream. The mode of preparation of both the whey and the meat-juice will be found amongst the recipes at the end.

During illness in an infant from two to three months old, it will be found that from 10 to 15 drops of meat-juice to a 2-ounce bottle of whey will be as much as can be digested; but this must be increased gradually until the child is taking about 2 ounces of the meat-juice in the twenty-four hours,

provided it is taking no milk, and cream to the extent of a good teaspoonful in each bottle must be added.

There is still another class of foods which at times is useful—namely, the broths made from beef, mutton, veal, chicken, or chicken giblets. These, like some already discussed, can only be used for a short time, when there is an intolerance of milk, or as an addition to milk, as they are much too poor in proteids to be a food for babies, besides which they contain neither fat nor carbohydrates. They are, however, rich in what are called extractives, which have a stimulating effect, and somewhat take the place of proteids.

It is important to remember, both for the sake of children and invalids, how little real nourishment there is in the strongest beef-teas and broths. The nourishing element in meat is a muscle albumen; this, like another albumen, the white of egg, is coagulated by heat. What happens, therefore, when beef-tea or broth is made is that this albumen is solidified and thrown away with the shreds of the meat, never getting into the liquid at all. It must not be gathered from this that these popular beverages are useless—far from it. The meat also contains substances called 'extractives,' which are highly stimulating, a small amount of a non-coagulable albumen, and salts. It is, however, a fact that an animal fed exclusively on the strongest beef-teas and broths will gradually starve to death, whilst another fed on milk will flourish.

The temperature of the food should be between 90° and 100°—that is to say, about the same temperature as the baby. To ascertain this, of course, a thermometer is necessary, and there is very little trouble in having one for this purpose; but most nurses depend upon their sense of touch, and doubtless with experience they get pretty accurate. Let us hope there are not many who judge the temperature like the old nurse depicted in *Punch*, who didn't believe in such new-fangled affairs as thermometers, but when she put her baby into the bath, if he went blue, she knew it was too cold, and if he turned red, that it was too hot. There are bottles sold with a thermometer attached, but these are hardly to be recommended.

One often sees babies being fed out of doors. The food in the bottle is heated before the nurse starts out for her walk, and there must be a good deal of trusting in luck that the contents will be of the right temperature when the baby's feeding-time arrives; and if the baby is a slow feeder, if the food is at about 90° at the start, it will be much too cold before it finishes, especially in wintry weather. Mothers should inquire into this.

Feeding-Bottles.

I have elsewhere pointed out the necessity for scrupulous cleanliness. The feeding-bottle should be scalded out with boiling water, or actually boiled

between each feed, and kept standing in fresh cold water. The teats should be made of pure rubber, as these also can be boiled. Directly they show signs of becoming rough, as the rubber perishes, they should be destroyed. As to the shape of the feeding-bottle, one important point must be borne in mind: no bottle necessitating the use of long tubes should be used. All such bottles are relics of a bygone age, and if any exist at the present day they should be destroyed. We, unfortunately, still see them in use amongst the poor, and as there is the utmost difficulty, amounting almost to an impossibility, in keeping them clean and sweet, they are the very last people who should use them. They would not do half so much harm in the hands of a skilled and well-trained nurse, who might perhaps keep them from getting foul; but a mother, who not only has her children to look after, but all the housework and cooking to do as well, one may be very sure has but little time at her disposal for bottle-cleaning, poor thing! But it is such a convenient bottle to dump down by the side of the baby in its cot or pram, the child being left to feed itself, and, when the milk is finished, to go on filling itself up with air! The only permissible form of bottle is that in which the rubber teat fits directly on to the neck of the bottle. A good and much-advertised one is made by Allen and Hanbury, but there is sometimes difficulty with the air inlet valve; another good one is Maw's, but there are

many on the market. Care must be taken that the child does not feed too fast; this can generally be regulated by the number of leech-bite holes in the teat, which can vary from one to three or four.

Warmth.

All young animals should be kept warm. This is a most important point in the rearing of infants. I will yield to no one in my love of, and belief in, fresh air, but I am sure that in these days of ventilation, nurses often err in not keeping the room where an infant is living at a sufficiently high temperature; and I fear that the professional nurse transgresses in this more frequently than the ordinary family nurse. During the first month of an infant's life the temperature of the room should not be allowed to drop much below 60°, nor should the child be taken from one room to another to be uncovered and shown to relatives and friends. Further, when the child is being bathed, this process should be hurried through as quickly as possible. A nude infant is frequently to be seen lying on a nurse's lap, in front of a fire certainly, but having just been taken out of a hot bath, with most likely a strong draught blowing from the door or window. Keep the child covered as much as possible with a warmed bath-towel whilst drying it, and then get it into its garments as quickly as possible. There is no surer way of deranging

digestion than by chilling a child, and besides which there is always bronchitis and pneumonia ready to descend on the careless. It is a good plan from time to time during the day to feel a baby's feet and legs to see whether they are cold. If they are found to be so, they should be warmed either by gentle friction with a warm hand, by artificial heat, or extra covering.

Another way in which I am sure many children are chilled—but this refers more to older ones, and not to infants—is by allowing them to sit and play on the floor. I will only ask any adult to sit for half an hour on the floor on a winter's day in a room with a good fire, and I should be interested to hear how much rheumatism he developed during the following twenty-four hours. I have tried it myself, and when there is a fire burning have always experienced a tremendous draught. The great bulk of the air supplying the burning fire comes from under the door, and this rushes along just above the level of the floor towards the grate. Therefore, if children are allowed to sit and lie about on the floor, some screen should be interposed between them and the door, to cut off the draught. An excellent arrangement would be a screen three or four fold, but only about 2 feet high; this would divert the draught without enclosing the child too much.

Motions.

That which an infant passes from the bowels should be brightish yellow in colour, of the consistency of thick gruel, homogeneous, and free from lumps and slime. Should there be any appearance of little white lumps, flakes, or streaks in it, it is evidence that the curd of the milk is not being thoroughly digested; and if this should persist for more than forty-eight hours, a change must be made in the food: the milk must be made weaker, or changed for some other food. This is a very important symptom, and should always be borne in mind, as it is frequently the first and only evidence that the food is not agreeing with the child; and if the indication is acted upon, serious illness may be averted. If the motions appear to be greasy or contain little flecks of grease, the child is not digesting all its fat, and the supply of cream must be diminished. When the motions are hard, not containing sufficient moisture, some change in the food may be necessary, and is better than giving drugs. It is a common trouble in children fed on cow's milk, and generally means that the food is not sufficiently stimulating. Very often the addition of a little malted food, like Mellin's, to two or three bottles during the day will effect a cure; or a little coarse brown sugar used in the same way; or a complete change of diet may be necessary. If

the desired effect cannot be brought about by suitable food, a little paraffin, olive-oil, or fluid magnesia are the most harmless laxatives. If jelly-like mucus is passed with the motions, it signifies that there is a catarrhal irritation of some part of the bowel; it is frequently due to the irritation of some retained lumps of matter which should have passed, but have become lodged, generally in the large bowel. A small dose of castor-oil will in most instances put this right. Sometimes, however, the irritation is caused by acid-fermenting food, either milk or farinaceous food ; in this case a change of diet is imperative.

When the motions are light in colour, it indicates that there is not sufficient bile coming from the liver into the bowels. This state of things may be caused by a catarrhal condition of the small bowel (duodenum) partially or wholly blocking up the opening of the bile-duct, or may be due to chilling, setting up a congestion of the liver, and so interfering with the secretion of the bile. A lighter and less irritating diet, avoidance of chill, and perhaps a dose of grey powder, followed by some fluid magnesia, is the best treatment. When there is a complete absence of bile, indicated by the motions being as white as paper, these latter are very apt to be fermented or decomposed, giving rise to a quantity of wind, as the bile is the natural antiseptic of the intestinal tract. Under these circumstances it is often necessary to give some mild antiseptic.

When a child has an attack of diarrhœa, the motions are frequently of a bright green colour. This in most cases is due to some decomposition changes, but in some instances it is caused by a certain microbe. This can be ascertained by testing whether the motions are acid or alkaline. In the diarrhœa of microbic origin the reaction is always alkaline, these special bacteria being unable to live in an acid medium, and this fact is taken advantage of, for it is found that by giving the child doses of lactic acid the disease can be cured.

THE FEEDING OF CHILDREN

Foods may be divided into five classes:

1. Proteids or nitrogenous, obtained chiefly from animal food, milk, meat, fish, etc., but contained also in a lesser degree in wheat, oats, maize, etc.
2. Hydrocarbons or fats.
3. Carbohydrates—starch and sugar.
4. Mineral salts.
5. Water.

Besides these, there are various substances, such as cellulose and woody fibre, which enter largely into the composition of vegetables, fruits, and seeds, but which cannot be regarded as true foods, the human body possessing no secretions wherewith to digest them, unless this is partially effected by a decomposition in the large bowel. They have, however, a useful purpose in stimulating the lining membrane of the bowels, and so preventing constipation by keeping up the natural movement.

All the five varieties of food are necessary for the growing body.

1. The chief function of the **proteids** (or albuminates) is to assist the formation, and repair the

waste of the body tissues, especially those which are nitrogenous, and they play an important part in the assimilation of oxygen. If necessary, they are able also to contribute to the development of muscular and nervous force, the production of heat, and even the formation of fat. From this it will be seen that the functions of the body could be carried on with a diet of albuminous substances only, but very large quantities would have to be taken, which would involve a considerable amount of waste.

2. **Fats** play a very great part in keeping up the body heat, and supplying force for muscular work. They are also found entering into the composition of nearly every tissue, and especially of the nerve and brain structures, a very important point to remember in connection with the feeding of children during the very active growth and development of their brains.

3. **Carbohydrates** do not enter into the composition of the tissues, but their chief use, like the fats, is to supply heat and force, and to check albuminous waste. Likening the human body to a steam-engine, as is so often and so aptly done, the carbohydrates would take the place of the fuel and keep the engine going, but they will not repair waste nor make new parts. For this iron and brass have to be called into use in the case of the engine, and in the human body the proteids, fats, and salts. The body scores over the steam-engine in that if

it cannot get a sufficiency of fuel, it can burn up its brass and iron—that is to say, the proteids and fats which will, if necessary, take the place of carbohydrates.

We cannot be kept alive for any length of time on carbohydrates alone, but with proteids it is different, for by giving large amounts this is possible, but entails a great deal of waste. Therefore it is best to give a mixed diet, in which the carbohydrates will act as economizers of proteids and fats.

4. **Salts.**—All the tissues of the body contain mineral substances, the chief being phosphate of lime, which enters very largely into the formation of bone. Chloride of sodium, or common salt, is also found in the composition of many of our tissues. These salts are to a great extent supplied by our vegetable foods.

5. **Water** is the chief constituent of our bodies, forming considerably more than one-half of our tissues. By its aid the circulation of the blood is able to be carried on, and the excretion of all effete material is made possible through the agency of the liver, bowels, kidneys, and skin, without which we should surely perish, poisoned by our own waste products. It is also necessary for the processes of digestion and absorption, and as a vehicle for nutriment to be carried to every part of the body.

For an adult it is difficult to estimate the proportions in which these different foods should be

taken, and undoubtedly a good deal depends on the work and life of the particular individual. A navvy doing little or nothing beyond muscular work requires a very different diet from a man earning his daily bread by means of his brains, and using his muscles but little. With a growing child it is otherwise. Its business in life is to grow and develop its various organs; not only to repair waste and keep up the temperature of the body, but actually to manufacture bone, muscle, blood, nerve and gland cells. In the infant we have a very clear intimation as to the exact proportions in which the various foods should be given. We need merely obtain some samples of human milk, analyze them, and the riddle is solved for us. Now, consider the case of a child from infancy up to, say, six or seven years old, or even up to the age of puberty: what proportions are we to give here? Is there any indication that it requires a change in its dietary? I must confess that I see none. The child has erupted its teeth, and can therefore take its food in a different form, added to which it naturally requires larger quantities; but I see nothing that indicates a very material change in the proportions of its diet. And yet what happens in the case of most, if not all, children? A very decided change is made in the quantities of carbohydrates given in proportion to the proteids and fats, and, what I consider more important, these carbohydrates, mostly the starches, are not given

in such a form that the masticatory apparatus is brought well into play. The starchy and saccharine constituents of the food advance in quantities by leaps and bounds, until the stomach is overburdened with them, and mostly in a form in which they can be eaten with little or no mastication, so reaching the stomach almost entirely unmixed with saliva, there to ferment and set up gastric disturbances.

Starch to be properly digested requires to be thoroughly mixed with saliva. This secretion contains a substance called 'ptyalin,' which has the property of converting starch into sugar. Starch in its natural condition is useless to the human body—it cannot be assimilated—but when converted it is readily absorbed. It enters largely into the composition of wheat, oats, barley, arrowroot, potatoes, and, as their name implies, all farinaceous foods, as rice, sago, tapioca, etc. From the enumeration of these foods it can readily be seen what a large amount of starch a child takes in its food. For breakfast he has some form of pap food, such as bread-and-milk or porridge, followed by bread-and-butter. At dinner he takes potato, bread and farinaceous pudding; and his tea consists almost entirely of bread-and-butter or jam and cake.

Now consider how this starch food is presented to the child. What I call its pap food is swallowed as soon as it enters the mouth, receiving no mastication, and therefore no insalivation. The same

thing happens to its milky puddings and to the potato, which has most probably been mixed with gravy to make it soft. The bread and cake are granted a certain amount of chewing, but as they are generally soft, they do not get nearly enough to thoroughly mix them with saliva, and down they go into the stomach to join the other crude starch. One has merely to watch a child eat, or rather bolt, a plate of bread-and-butter, to be quite certain that very little saliva gets mixed with it. What is the fate of this unsalivated starch? It goes down into the stomach, where it has to remain for a time, whilst any proteid food, like the curd of milk, is being dealt with by the gastric juice; and remember that the gastric juice has no digestive action on starch. There, in the stomach, this idle starch is very prone to ferment, forming lactic acid and other irritating substances, which give rise to gastric catarrh, and thoroughly disorganize the digestive process.

Dr. Harry Campbell, in some interesting articles published in the *Lancet* on the evolution of man's diet, says that in precooking days very little unaltered starch found its way into the human stomach. All nuts and seeds had to be thoroughly masticated, and fruits containing saccharine materials were eaten. He also says: 'Another effect of agriculture has been to greatly increase the amount of crude starch entering the stomach. We have seen that before the discovery of cooking comparatively little undigested

starch passed into this organ, and that cookery, by leading to an increase in the amount of starch ingested, and by diminishing the work of mastication, and consequently the completeness of buccal digestion, led to an increase in the quantity of crude starch passing into the stomach.

'The introduction of agriculture operated still further in the same direction, and augmented the supply of starch to an enormous extent. Within recent times, moreover, it has been the fashion to consume most of the starch in a soft, pappy, or pultaceous form—*e.g.*, of boiled potatoes, refined bread, porridge, and puddings of various kinds, which readily pass into the stomach, with little or no preliminary mastication and insalivation, so that, in striking contrast with what happened in the case of early man, the modern stomach *is literally deluged with crude starch.* This practice among moderns of consuming most of their starch in a soft form cannot be too strongly condemned.'[1]

So long ago as 1867 Liebig said in his 'Food for Infants' that the usual farinaceous foods are the cause of most of the diseases and half the deaths of infants. Three things can be done to improve this state of affairs:

1. The amount of starch given can be reduced.

2. It can be given to the child in such a form that it is obliged to masticate it, and therefore mix it with saliva.

[1] *Lancet*, September 17, 1904

3. When it is desired to give it in a soft and pappy form, it can be given only in the foods in which the starch has been dextrinized and rendered soluble, as in malted foods.

Let me now set forth the proportions of an infant's food (human milk) and those of a child of three or four years old, and compare them.

On making an investigation into the subject of the analysis of human milk, I find one is confronted with very varying tables, the variations being in some cases considerable. I have therefore taken four of what I consider should be the most reliable analyses, and from them have struck an average. Calculated in 1,000 parts, the solid constituents are as follows:

	Dujardine Beaumetz.	Luff.	Klein.	Vernois and Becquerd.	Average.
Proteid -	10·52	23·5	35·0	39·24	27·00
Fats -	40·43	24·1	25·0	26·66	29·75
Carbohydrates -	76·14	63·9	48·0	43·64	57·75
Salts -	2·14	3·4	2·0	1·38	2·25

Now let us take an ordinary diet for a child of three or four years of age, and see how it compares in its proportions with the milk analysis.

Breakfast.—A basin of porridge, bread-and-milk, or some patent food, a lightly cooked egg, or some fish, with a piece of bread-and-butter.

11 *o'clock.*—Milk and a biscuit.

Dinner.—Some fish, chicken, or meat, potatoes and green vegetable, with a piece of bread, either crumbled and mixed with the meat and gravy or eaten separately; a good helping of farinaceous pudding.

Tea. — Milk, with bread-and-butter and jam; cake.

Bedtime.—A small quantity of some farinaceous food (which in my table I have calculated at the moderate amount of a tablespoonful of oatmeal). I have worked this out, with the following results:

Food, with Amount taken during the Day.	Proteids.	Fats.	Carbohydrates.	Salts.
1½ pints of cow's milk (=about 850 c.c.)	34·85	34·15	44·20	6·80
5 oz. bread (=about 141 grms.)	11·43	2·25	72·03	3·24
1 oz. cake (=about 29 grms.)	2·26	0·44	20·55	0·62
6 drms. of butter (=about 23 grms.)	1·15	20·70	—	—
6 drms. of sugar (=23·33 grms.)	—	—	23·33	—
2 drms. of biscuit (=8 grms.)	1·24	0·10	5·87	0·13
1 drm. of jam (=4 grms.)	—	—	2·0	—
1 egg	7·0	5·25	—	0·75
2 oz. cooked fish (=about 60 grms.)	10·86	1·74	—	0·60
2 oz. cooked potato (=about 60 grms.)	1·26	0·12	13·20	0·42
2 oz. rice (about 60 grms.)	3·78	0·44	47·70	0·30
½ oz. oatmeal (=about 15 grms.)	1·89	0·84	9·57	0·45
	75·72	66·01	238·45	13·31

I do not think this can be considered an exaggerated diet as regards the starch and sugar. I have only allowed for 1 ounce of cake, and in that have not taken into account the sugar. I have only calculated for 1 dram of jam and 6 drams of sugar, which will not nearly cover the amount of sugar that most children consume in the form of sweets, chocolates, etc., or sprinkled over their puddings, or in the form of treacle or jam, or contained in sweet fruits, nor have I included a large quantity of bread; but I am anxious to understate rather than run the risk of being accused of overstating that on which my argument is based.

It must be borne in mind that in this calculation I am not considering the *total amounts* of any of the elements of food, a very difficult thing to gauge, but the *proportion* of starch and sugar (carbohydrates) to the proteids or albuminoids and the fats. Roughly reducing the proteids to the same amounts and neglecting the decimals, the following table gives the comparison between the two diets:

	Human Milk.	Child's Diet.
Proteids	27 ..	27
Fat	29 ..	23
Carbohydrates .. .	57 ..	85
Salts	2 ..	4

This shows a deficiency of fat in the diet of the child, an excess of salts, and a considerable excess of carbohydrates. To my mind, therefore, one of two things is happening—either the child is getting

an excess of food in the extra starch and sugar, or there is a deficiency of proteid, and still more of fat, in its diet. Of course, it may be argued that children of three or four years of age require more starchy food in proportion to the other constituents than the infant, as they have to supply considerably more fuel for muscular energy; but even allowing for some excess, say another 10 or 15 parts on our table, we have still far from reached the amount in the child's dietary.

I would therefore beg for less starch and sugar, and more fat, the starch that is given to be in such a form that it must be masticated, and the increase of fat to be supplied by good fresh butter. It must be borne in mind that this is not mere theory. It never occurred to me to work out these proportions until, after some years' observation, I noted the great improvement in delicate children when their starches and sugars were reduced, and they were given more of the albuminates and fats; especially was this the case in those constantly suffering from bilious attacks. And, furthermore, although the diet containing the extra starches and sugars should be the more fattening one, I have seen a child improve wonderfully in weight, as well as in general health, by being put on the restricted diet.

My suggestions for a diet in place of that condemned would be somewhat as follows:

Breakfast.—A scalded or poached egg, some white fish, or some fat bacon, either grilled or cold boiled;

one piece of crisp toast, cut fairly thick from the whole side of a toast loaf, or a crusty piece of dry bread with plenty of butter, and half a pint of boiled milk. If more is wanted, one or two crisp rusks with butter may be given.

11 *a.m.*—A teacupful of boiled milk, or some soup or broth.

Dinner.—A good helping (2 to 3 ounces) of mutton, chicken, game, fish, tripe, calf's head, sheep's head, or rabbit, with *plenty* of well-cooked green vegetable, but little or no potato. (Beef, veal, and pork should be avoided, as also all twice-cooked foods, and root and raw vegetables.) *Pudding.*—One of the starchless ones (see table), with occasionally one containing a small amount of starch. If the child has a strong digestion, some baked apple, stewed prunes or figs sieved, can be given with the pudding. No bread to be taken with this meal.

Tea.—The crusty parts of stale bread, either brown or white, or crisp toast with plenty of butter, and one piece with a good spreading of honey or treacle, followed by rusks or crisp biscuits; half a pint or more of milk.

Bedtime.—A teacupful of boiled milk.

By this plan the mid-day meal becomes almost entirely a starchless one, and this is an important point. When meat, or any food requiring some hours for its digestion, is eaten, the outlet of the stomach remains closed until such time as the fragments of meat are so far digested as to be able to

pass through into the bowel, until it is reduced to about the consistency of cream. If starch be taken at the same time, it is retained washing about in the stomach during these hours of digestion, and is then most apt to ferment, giving rise to flatulence and acidity.

When the child has once learnt to thoroughly masticate, stale bread-and-butter and plain cakes can safely be given with its tea meal, as it can then be trusted to thoroughly insalivate them; but during the period of its learning the art of mastication, these things are better withheld. With children who are bad digesters of milk, it is a good plan to try giving them the curdled milk. This is made by curding the milk in the form of a junket, and then thoroughly breaking the curd up again. Milk dealt with in this way does not reform into curds in the stomach, and is therefore more easy of digestion.

MASTICATION

THE value of thorough mastication of food does not receive the attention it deserves, especially from those who are intrusted with the rearing and instruction of children. Much care and money are spent on having children taught the piano, to dance, to drill, and generally to physically exercise; but how many mothers have given five minutes' thought to the way in which their children masticate their food? Doubtless most people think that mastication, like the act of sucking, is inborn, that it requires no teaching; and I think undoubtedly this would be the case if the child were fed from the commencement of its teething on nuts, roots, raw hard fruits and grains, food which it could not swallow without breaking it up in its mouth, as it would have been in the state of nature, where cooks and culinary apparatus did not exist. It is really alarming to anyone with any knowledge of the physiology of digestion to see the way a child will bolt its dinner or its tea: a plateful which should take ten or fifteen minutes to eat is swallowed or gulped down in about three minutes. And yet how much depends on the

proper digestion of food! The whole welfare of the individual—the formation of its tissues, bone, blood, muscle, brain, and the efficient repair of waste. Look for one moment at the white, listless, half-starved-looking little children that unfortunately one so often sees, even amongst the upper classes of society. It is not that these children have any insufficiency of food—in a good many instances they have too much—but in a great many cases it is that they do not know how to eat what they do get, and their poor little stomachs are inundated with food ill prepared for them, and with which they are unable fully to deal, the irritation from which gradually sets up a chronic gastric catarrh, leading to the general ill-health of the child.

Not only does mastication increase the flow of saliva, but it has been conclusively proved that by a reflex action it also stimulates the secretion of the gastric juice, so that not only the starches on which the saliva acts, but the animal food also, is more thoroughly digested. It is a popular fallacy that minced meats are more easily digested, and though this doubtless is so in the case of those with faulty teeth, or with teeth which are not properly used, a piece of tender mutton thoroughly masticated will be much more easily dealt with in the stomach than an equivalent quantity reduced to the finest mince. The drier the food, the more saliva is secreted, so that a better flow is occasioned by such foods as rusks, biscuits, and toast, than by soft bread and cake.

Improvement in digestion is not the only advantage gained by thorough mastication: the teeth will be stronger, whiter, and less likely to decay. It is a well-known and demonstrable fact that any part of the body which is thrown into disuse, or only partially used, degenerates; and man has many instances in his body of vestiges of disused parts, such as muscles for the erection of his ears, a third eyelid in the inner angle of his eye, and the continuation of his spine into an embryo tail. Our teeth were developed originally to enable us to gnaw bones, to eat hard nuts and berries, and with which to tear through muscle and vegetable fibre.

Civilization, with its cooking and food-preparing, has to a great extent done away with the necessity for this; our meats are skilfully prepared, our puddings and bread are soft, leaving very little for the teeth to do. Surely under these circumstances there is the fear of our teeth sharing the fate of our ear muscles and our tails; and do they not by their early decay already show signs of this?

Sailors proverbially have good teeth, the reason being that they have to work pretty hard with them to make any impression on the ship-biscuits and salt beef. This fare, however, is now being altered, and with the introduction of bread we may anticipate more dental caries in the navy. The act of mastication, like all other muscular exercise, increases the flow of blood and lymph in the parts, and so leads to better nourishment, with consequently more com-

plete development. We hear much now of adenoid growths in the naso-pharynx, and I quite agree with a suggestion of Dr. Harry Campbell's, that an increased blood-supply to the upper and lower jaw and surrounding parts would, to a large extent, prevent this troublesome complaint, with its consequent ill-developed chest, tendency to catarrh and bronchitis, inflammation and abscess in the ears, and, through deafness, want of mental development. It may seem rather a far cry from the neglect of munching a crust to an ill-developed chest and an attack of bronchitis, but to my mind, if the problem is looked into, the connection becomes very probable.

Since writing the above, I have read a very interesting article on 'Physical Degeneration in Relation to the Teeth,' by Dr. Sim Wallace, in the *British Medical Journal*, November 19, 1904, from which I venture to make the following quotations:

'We cannot expect physical development to go on satisfactorily so long as the teeth are decaying or are otherwise diseased. How this must necessarily be so is well known to all of us. Dental caries is simply an outcome of oral indigestion: the carbohydrates are not digested as they ought to be; they are neither subjected to the churning motions of mastication nor the insalivation they require, for they are as a rule presented to children in a state which stimulates neither mastication nor the flow of saliva. All parts of the process of digestion are necessarily intimately correlated, so that it does not

surprise us that this disturbance of the first stage of digestion is very apt to upset the normal working of the stomach. Of course, if digestion does not go on satisfactorily, neither will physical development.'

Again: 'I had been struck by the marked superiority of the teeth of those who ate the least soft and refined food, and also saw what appeared to me good evidence that those who had been brought up on, and continued to eat natural, unrefined food, had a much better digestion than those who ate the most refined and apparently physiologically digestible food. In other words, I came to the conclusion that food which demanded efficient mastication was not only best for the teeth, but for the stomach and intestines also.'

And again: 'The continual increase of highly prepared and nutritious foods is a matter to cause grave apprehension to anyone who is convinced that it is necessary to eat the natural food-stuffs to which the alimentary canal, from mouth to anus, has through countless generations become adapted. Almost every day we have thrust upon our attention some new extract of beef, or some predigested or malted preparation, or some proprietary food imitating all the disadvantages of milk. It should be pressed on everyone that all these highly assimilable preparations are most dangerous, in that they are sure to leave a small residue in the intestine, which is bound sooner or later to ferment, and give rise to ptomains or other highly poisonous products.

'In conclusion, I would remind you that it (the feeding of children) is not only a dental question, it is not only a medical question, it is not only a national question, but it is probably the most important of all questions affecting the physical well-being of humanity throughout the length and breadth of the civilized world.'

Also, in the same journal, Dr. Sidney Spokes says:

'It is the fact that the large majority of people, both young and adult, do not efficiently prepare food for proper presentation to the stomach. Our ancient forefathers, who left the well-ground-down teeth we find in such skulls as come to light, were not in a hurry to get to school in time, nor to catch trains.

'Moreover, the food was hard and tough, and the necessary mastication resulted in a large flow of saliva, not only beneficial for gastric digestion, but for the teeth, which were bathed in this alkaline fluid.'

The cause of the decay in teeth is usually assigned to bacteria, which can flourish only in an acid medium. The saliva in its natural composition is alkaline, and so long as this secretion is in no way altered, the teeth kept moist with it will not decay. But a serious alteration does take place. In the first case, owing to deficient mastication, a free amount of the fluid is not secreted; and, secondly, food which clings about the teeth gets into depressions in the enamel, and, caught between the teeth,

decomposes, and, in the case of sugars and starches, turns the alkaline into an acid medium, owing to the formation of free lactic acid. The proteids and fats do not have this effect; in their decomposition no acid is formed, and the bacteria of dental caries cannot flourish.

This has been demonstrated experimentally. Miller found that by putting teeth in a mixture of human saliva and bread or sugar, and keeping this for some time in an incubator, the fluid turned acid, with the formation of lactic acid, and the teeth decayed with all the appearance of teeth decayed in the mouth. The process seems to be a twofold one: lactic acid dissolves out the lime from the dentine, and the bacteria disintegrate the other tissues.

Mixing other food, proteids or fats, free from any carbodydrate, with the saliva, and treating it in the same way, the decomposing mass remained alkaline, and no decay took place in the teeth (*British Medical Journal*, February 18, 1905, p. 366).

The presence of decayed teeth in the mouth is injurious to health in other ways than preventing efficient mastication. There is a constant supply of matter and other injurious products of decay which is being swallowed down into the stomach, and in bad cases the air inhaled into the lungs is also contaminated. All food swallowed is mixed with effete and poisonous material, and a good many cases of anæmia and serious derangement of health can be traced to the absorption of poisonous products

derived from the decay of teeth, and suppuration around their roots. Of what avail is it to pay such particular attention to the drainage and ventilation of a house, when the inmate of it contaminates his food and his respired air by means of decomposition in his own mouth ?

Children's teeth should be well brushed night and morning, the former being by far the more important, as it is during the night the greater part of the mischief is done, by the residue of food around the teeth. A mild alkaline and antiseptic powder should be used, with plenty of tepid water. A very important point to impress on nurses is that a child must have no food given it after its teeth have been brushed at bedtime. I find it is a very common occurrence for a child, after it has been washed and had its teeth cleaned, to be put into bed and given a biscuit, thereby at once undoing all the good of the tooth-cleaning. The morning tooth-cleaning is of value, but the night one is of the greatest importance, and when the child is old enough a good plan is for the nurse to clean them at bedtime, and so be sure that they are thoroughly done, and for the child to be allowed to do it for herself on rising in the morning. If the teeth could be cleansed after every meal it would, of course, be a decided gain, but this is hardly practicable. Any sign of decay in the first teeth should be seen to at once; it is a mistake to think that because they are only the milk-teeth it doesn't signify. Besides the fact that carious

teeth interfere very materially with the child's masticatory powers, they exert a baneful influence on the proper formation of the second or permanent teeth; and be it remembered that teeth once formed, good or bad, so they remain to the end of their owner's natural life, or, rather, until they are lost, which, unfortunately, is in most cases a considerable period before the end.

See, then, how important is the original growth of the teeth, and how necessary it is to guard with the utmost care a child's first teeth, as on them the structure of the permanent set partially depends.

ACUTE GASTRIC CATARRH

(Bilious Attacks)

THE liver, besides being the organ for the secretion of bile, may be likened to a granary: it acts as a storehouse in which to lay by food. During periods of plenty, when food is abundant, nourishment, in the form of a species of sugar called 'glycogen,' is accumulated in the cells of the liver, to act as a reserve to be called upon during periods of starvation or in illness, this glycogen being derived from the carbohydrates—the starches and sugars of our foods. When the liver cells contain, within a certain range, what may be called their normal amount of glycogen, all goes well; the individual cells are their natural size, circulation through the whole organ is free and unimpeded, and it performs its functions without difficulty. But, unfortunately, like its host, it has the power of taking in more than is good for it; its cells become overfilled and distended, causing naturally an enlargement of the whole organ. The effect of this enlargement is a pressure on the blood-vessels ramifying through its substance, causing obstruction to the flow of blood and a consequent en-

gorgement of all the vessels supplying this blood. Now, the greater part of the blood flowing through the liver is derived from the bloodvessels circulating in the coats of the stomach and the intestines, so that when the blood is dammed back by pressure in the liver on the big vein, called the 'portal vein,' which conveys all this supply of blood, a congestion is caused in the walls of the stomach and bowels. This congestion interferes very considerably with their functions, hindering digestion, diminishing absorption and the secretion of their natural juices, and causing a swelling of the mucous membrane. In this way a catarrh in the stomach and bowels is set up, which is considerably aggravated by the fermentation of food, induced by the faulty supply of gastric juice, and its retention in the stomach for an abnormal period.

As the mucous membrane of the small bowel becomes congested, the opening of the bile-duct gets narrowed, and less bile, which is secreted in the liver under very low pressure, is able to escape. When the congestion is sufficient to cause complete closure of this opening—and no great amount is required in the case of a small child—we get motions passed which are quite white, showing the absence of bile, and the condition of the liver is then aggravated; for, besides being enlarged from the excess of glycogen, its ducts and canals become blocked up with retained bile.

During the partial distension of the liver, from

there being an excess of glycogen present, a moderate amount of congestion of the lining membrane of the stomach and bowels is maintained. A child in this condition can be said to be suffering from chronic gastric catarrh; but when the liver gets still further engorged, either as the result of an excess of food, a large intake of sugar, a chill, or a nervous upset, considerable congestion of the stomach and bowels is the result. Digestion and absorption come to a standstill, mucus is in most cases freely secreted in the stomach, and the child has what is known as a 'bilious attack.' The contents of the stomach are rejected, followed by the vomiting of mucus, and diarrhœa with pain may or may not be present. The child, fortunately, refuses all food, so that the liver is able to give up some of its excess of glycogen, and in about forty-eight hours Nature effects a cure. But in most cases this is not a permanent cure: the child, when its appetite recovers, returns to its evil ways of eating too much sugar and starch, the liver is gradually filled up again, and the air has to be cleared sooner or later by another thunderstorm, in the form of a bilious attack. And so these sufferers from chronic gastric catarrh go on, laying in day by day more fuel than they can burn up, until, when there is accumulation enough, an explosion occurs.

The liver is not alone to blame: an excess of starch when retained too long in the stomach ferments, forms lactic acid, and so acts as a local irritant to the mucous membrane, being quite able, independently

of a congested liver, of starting a bilious attack on its own account. I think in most cases it is a joint affair. The liver is overfilled; this, as I have pointed out, by its interference with the circulation, checks digestion in the stomach; the starch, being retained there longer than the normal duration of digestion, has time to ferment, and the resultant lactic acid irritates the already congested mucous membrane lining the stomach. Look at it which way we will, an excess of starch and sugar—the carbohydrates—is the cause of the sick attacks, and not too much butter and fat, as is generally supposed. These will certainly make matters worse when the child is already bilious, by thickening the secretion from the liver, but they are not the primary cause. They can, therefore, be eaten with impunity when the carbohydrates have been reduced, and taken in a form requiring mastication.

Such symptoms, then, as ill-temper and irritability, a disinclination to play, with a desire to lie about on account of fatigue, restlessness at night, with sometimes night terrors, loss of appetite, a coated tongue, and unpleasant breath, accompanied generally with constipation, but sometimes with diarrhœa, should lead one at once to suspect that this catarrhal condition has been set up.

Some children are very liable to these attacks; any irregularity of diet, chill, or either mental or physical fatigue will bring one on. A child is allowed to go to a party, or perhaps to the pantomime—in

the latter case no rich cakes or party dishes being partaken of—and the next day it is laid low with a bilious attack. It is my belief that these children are sufferers from chronic gastric catarrh, which will flare up into an acute form as the result of any irregularity or chill. They should not only be treated for the attacks as they arise, but should be put on to a careful non-irritating diet, with a considerable diminution of their starches and sugars, by which means they can usually be completely cured.

As has been said, the most common immediate cause of the bilious attack is fermentation of food in the stomach and bowels. The by-products of this fermentation are absorbed into the blood, affecting the general health, and the excess of acid formed acts as an acute irritant to the mucous membrane of the stomach and intestines, increasing the congestion, and causing the secretion of mucus, vomiting, and purging.

In an acute case the first indication is to clear away the fermenting material, preferably with an antiseptic aperient like calomel; then, to soothe the stomach and bowels, to give the most easily digested foods, and those least likely to ferment or irritate, and to administer them only in small quantities.

It is not my intention to enter here into the matter of drugs, but to limit myself to what I consider of greater importance—the diet. In an infant the fermentation may have been set up in the curd of ill-

digested milk, especially in those babies fed upon cow's milk, or it may be that the child has been taking some patent food containing a considerable quantity of unaltered starch. This latter is quite the most common cause amongst the children of the poor, where they are fed upon such things as corn-flour, bread-and-milk, potatoes, etc., and amongst whom the death-rate from infantile diarrhœa is very high; in some hot countries especially, where food does not keep well, it is really enormous. In bottle-fed babies, even when they are fed upon a suitable mixture, an attack may be started by the food being tainted at the time it is given, either through being kept too long, or through want of cleanliness in the cooking utensils or the bottles themselves. And here let me say a word as regards cleanliness. In the feeding of infants absolute scrupulous cleanliness is almost as essential as in surgery, and I have many times regretted that the children's nurse cannot go through the same training in the meaning of real aseptic cleanliness, as do our best hospital surgical nurses. A bottle, a jug, or a saucepan in which a particle of milk has been allowed to remain and get sour, will immediately contaminate any fresh milk put into it, and although great care may be taken to obtain a good and fresh milk supply, one's efforts may be entirely neutralized by a careless or ill-trained nurse. All utensils fitted to stand it should be actually boiled, not only scalded out with boiling water. This can be safely done to glass bottles, if

they are put into cold water, which is then brought up to the boil.

With older children the attacks are generally due to too much sugar, too much starch in an indigestible form, or too much fruit; less frequently to heavy food, like a hearty meal off heavy meat, chilling, or over-excitement. The necessary modifications in the feeding of infants during attacks of diarrhœa and sickness, I have discussed in the chapter on 'Infant Feeding,' so I need say nothing further here.

For the older child during the first twenty-four hours of an acute attack, little or no food need be given; if there is a good deal of vomiting, little drinks of hot or cold water, or effervescing water, only should be allowed. A good plan occasionally is to give a teacupful of soda-water, with about half a teaspoonful of bicarbonate of soda dissolved in it. This should be drunk off at one draught. The usual result is that it is soon vomited again, and so the stomach is washed out, and any acid contents neutralized. As the vomiting ceases, a little boiled milk can be added to the soda-water—about 1 part of milk to 4 of soda-water, the proportion being gradually increased up to half-and-half, and given in drinks of about a claretglassful every hour. When this is well borne, a small cup of Benger's Food or Horlick's Malted Milk may then be given, together with drinks of whey. The bowels should be attended to, and the child kept warm and in bed.

During the next twenty-four hours, if sickness and nausea have quite subsided, some rusks and hot milk may be taken for breakfast, a scalded egg and some fingers of crisp toast or rusk for dinner, and a junket, Benger's Food or Horlick, with rusks or biscuits, for tea, drinks of milk or either of the two above-mentioned foods, if necessary, between meals. The third day the child can be given fish, preferably whiting or sole, and any of the light starchless puddings, and so, through sheep's brains, chicken, and such light solids, to an ordinary diet.

I have fully discussed the diet recommended for children suffering from chronic gastric catarrh, in the chapter under that heading, and I think it may be taken pretty well for granted that those children who are frequently suffering from bilious attacks, suffer, some more and some less, from the chronic condition during the intervals.

There is decided evidence to show that the predisposition to gastric catarrh is in many cases inherited. In some families two or three children will be affected, where parents, either one or both of them, suffer from faulty digestion.

CHRONIC GASTRIC CATARRH

When a child is suffering from chronic gastric catarrh, many or all of the following symptoms will generally be observed: Every few weeks, or perhaps only at intervals of some months, he will have a 'bilious attack,' which, as I have pointed out elsewhere, is an attack of acute gastric catarrh. There may be sickness and diarrhœa, or vomiting accompanied by constipation, or vomiting may be absent, the child suffering only from an attack of diarrhœa; or, again, the attack may take the form of a feverish attack, with no symptoms, except loss of appetite, pointing to the stomach or bowels—simply a temperature running up to 102° or 103,° with, or may be without, headache. These attacks are frequently determined by chill, over-fatigue, or a little unaccustomed food. At other times the child's temperament will be uncertain, frequently in the highest of spirits, but often irritable, cross, and easily reduced to tears; his appetite capricious, but not good, sometimes, indeed, very bad, requiring a lot of coaxing. The coaxing generally takes the form of sugar or jam being mixed with many of the foods, and

thereby fuel is added to the fire. He will be thin, badly nourished, and anæmic, likely to be a sufferer from adenoids, and much given to catching cold; a restless sleeper, waking and turning over frequently, with occasional attacks of night terrors. The cases naturally vary a good deal in their general aspect, but the most constant symptoms are: anæmia, an irritable disposition, with marked liability to sick attacks, and the absence of a child's natural, rather voracious appetite.

As in nearly all these cases the liver is engorged, and the gastric irritation is kept up by fermenting starch and sugar, a considerable change must be made in the child's diet. For the time, at least, the amount of starch and sugar must be reduced; the starch which is given must be in such a form that the child has to masticate it, or it must have been rendered soluble by malting, and all other irritating articles of food must be avoided.

At first there may be difficulty in changing the child's diet. He may object to taking unsweetened foods, and if he has been in the habit of getting soft bread, with a plentiful spreading of jam, he may look askance at crisp toast and butter; but my experience is that with perseverance—and, after all, most things require that—together with judicious firmness, a very radical change of diet can generally be managed. It will then be found, as the child's stomach regains its tone, his appetite will become so keen that the plainest food is taken with avidity,

and the necessity for specially tempting foods, as sugar, jam, plums, etc., no longer exists.

One's desire in the matter of food, as in a good many other things, is very much a matter of habit. An adult who takes sugar in his tea and coffee, eats sweets and rich puddings, and drinks wine, is miserable for a short time if these luxuries are denied him. But let him persevere long enough, and the time will usually be surprisingly short, when he will find he becomes quite content with his altered fare; and in most cases, if he tries to return to his sweets, especially in the case of sugar in his drinks, he will consider them almost nauseating. With a child certainly no one need despair of a speedy change, with very little difficulty. The sweets and starches should be decreased gradually, but fairly rapidly, and a change to the suggested diet should be accomplished in a week or two, or less.

Foods which may be taken.

Soups.—Any clear soups, broths, or beef-tea.

Fish.—Sole, whiting, plaice, haddock, brill, bream, small turbot, hake, ling, and tender cod.

Meat.—Mutton, calf's head, sheep's head, sheep's or calf's brains, sweetbread, tripe, calf's feet, calf's tail.

Poultry or Game.—Chicken, turkey, pheasant, partridge, guinea-fowl, pigeon.

Eggs.—Best either scalded or poached (not fried).

Vegetables. — Cabbage, spinach, sprouts, cauliflower, broccoli, French beans, marrow, boiled cucumber, Jerusalem artichokes, asparagus, sea-kale, and celery (cooked), if tender and not stringy.

Puddings.—Any of the non-starchy puddings, as junket, custard, calf's-foot jelly, etc. (See list.)

Fruit.—When on the really strict diet, stop all fruit.

Fats.—Butter, cream, the fat of bacon, either hot grilled or cold boiled, the latter being the more easily digested.

Extras.—Crisp toast, baked bread, rusks, plain biscuits, as breakfast biscuits, tops and bottoms or German rusks, salt in moderation, and, if necessary, a little saccharine or saxin may be used in place of sugar.

Drink.—Milk, cocoa, barley-water, oatmeal-water, hot or cold water, Horlick's Malted Milk.

As the child improves, the following articles may also *be given in moderation :*

Fish.—Smoked haddock, bloaters, kippers.

Meat.—A small quantity of under-cut from sirloin of beef.

Vegetables.—A little very well-cooked potato (it is best baked slowly and thoroughly in its jacket, as in this way all its salts are retained); green peas, if young and tender.

Puddings.—Rice soufflé, Grape-Nut jelly, Grape-Nut pudding or soufflé, rusks and calf's-foot jelly; a moderate quantity of any well-cooked farinaceous pudding, or well-cooked suet-pudding.

Fruit.—The pulp of baked apple, prunes well cooked without sugar and then put through a sieve, banana mashed into a cream with a fork, and occasionally a little pulp of a ripe peach, nectarine, apricot, greengage or plum, but very much in moderation.

Extras.—A little stale bread, especially the crust; rusks made from penny buns, or Madeira or sponge cake; plain sweet biscuits, as Marie, Butter-fingers, Captain, Petit Beurre; occasionally a little stale sponge or Madeira cake, and a little strained honey (not in the comb), golden syrup, or Frame Food jelly.

Foods to be Avoided.

Soups.—All thick and rich soups or those containing strong flavourings, pea or lentil soup, ox-tail, turtle, or mock-turtle soup, and those thickened or made with rice, barley, cornflour, flour, etc.

Fish.—Salmon, trout, mackerel, eels, crab, lobster, whitebait, smoked salmon, sardines.

Meats, etc.—Beef (all parts except under-cut of sirloin), veal, pork; all twice-cooked meat, poultry or game, sausages; all spiced dishes and those with rich sauces; liver and bacon, ox-tail, duck, goose, and all black game.

Vegetables.—Potatoes and all root vegetables, as turnip, carrot, parsnip, beetroot, and radishes; all raw vegetables and salads, watercress, cucumber,

broad beans and haricot beans, green peas (unless very young), tomatoes.

Cheese.—All varieties.

Puddings.—All heavy puddings containing flour or bread, such as ginger or treacle pudding, jam roll, plum-pudding, mince-pies, trifle, all kinds of pastry, fruit tarts.

Dessert.—Raw apples, pears, strawberries, raspberries, currants, gooseberries, cherries, pineapple, figs, melons; dried fruit (raisins, figs, French plums, currants, sultanas), crystallized fruits, walnuts, cob-nuts, olives, almonds.

Fats.—The fat of mutton, all cooked butter, and fried oils.

Extras.—Soft pappy bread, especially new bread, biscuits containing a quantity of sugar, oat-cakes, and wholemeal biscuits, plum-cake, seed-cake, buns, scones, muffins, crumpets, Yorkshire pudding, sugar in any quantity, jam, marmalade, mustard, pepper, pickles, chutney.

Drink.—Tea, coffee, wine, and all malted liquors.

As regards fruits, my opinion is that when there is any gastric irritation, they should be avoided altogether. This is founded on observation, not only in children, but in the case of adults also. It is not a popular belief, nor one shared by a good many of my professional brethren. When ordering all fruits to be discontinued, one is generally met with the objection: 'Oh, but fruit is so good for

one; and, besides, it acts on the bowels.' True, in a great many ways it is good for one, and it does increase movement and secretion in the bowels. But how? Assuredly by acting as an irritant: in the first place by the acids it contains, but to a greater extent by the local irritation of its indigestible particles—the cellulose, pips, and seeds. What I would urge, therefore, is that those substances which will irritate the bowels will also irritate the stomach. If only the fruit could be swallowed straight into the intestine, leaving the stomach alone, doubtless it would agree well, and be good for the patient in cases of gastric catarrh; but as the stomach has to harbour it first, frequently for some length of time, it does a good deal of harm to that organ before it reaches the bowels.

It is important that it should neither be given with the mid-day meal, nor in the evening. In some hot countries where diarrhœa is prevalent they say: 'Fruit in the morning is gold, but at night lead.' If taken into the stomach at the same time as meat, chicken, or even fish, it has to remain there during the three or four hours whilst digestion is being completed, and during that time it is likely to set up irritation in the gastric mucous membrane. Under these circumstances, when a child is given fruit, it is better to give it either before breakfast, at that meal, provided it is a light one, or between breakfast and dinner—say at eleven o'clock. A useful rule is never to give fruit after mid-day.

I advocate as soon as possible giving some of the least irritating fruits, such as baked apple, stewed and sieved prunes, or the pulp of ripe peaches, apricots, etc., but avoiding entirely the more highly acid and irritating varieties; and let me here add that I believe there is no fruit so harmful as strawberries in the case of either stomach or bowel irritation.

Further, this argument also applies to other irritating particles of food, such as the husk in wholemeal, coarse oatmeal, etc.; but this can be made less irritating by prolonged boiling.

I am ready to grant that the strict diet for gastric catarrh is a constipating one, but it is so because it is an unirritating one, and that is the form of diet which is absolutely necessary for its cure. We are, as it were, between the devil and the deep sea: either we must give food which will irritate the bowels and cause them to act, but at the same time keep up the gastric irritation, or we must give the constipating bland diet. Under these circumstances, it frequently for a time becomes necessary to give mild aperients.

When the gastric catarrh is cured, provided the fermentation due to an excess of starch and sugar is avoided, fruit will be well tolerated, and it will then be safe to give more in the way of rough food, such as whole wheat-meal biscuits, oat-cakes, etc.

CONSTIPATION

CONSTIPATION may be defined as a condition in which evacuation from the bowels is difficult and deficient, in which either the frequency of the evacuations is at fault, or the amount is insufficient, both leading to accumulation. This must not be looked upon as a disease, but rather as a symptom, which, if neglected beyond a certain point, may lead to disease. In adults, the number of actions is generally one in the twenty-four hours, but with children it varies from three or four actions of an infant to one or two of a child of nine or ten. Frequently amongst adults one meets with cases where the bowels are relieved only once in every three or four days, especially with females, and this often without any symptom of harm; but a rule should be made with children, after the infant stage, that there should be at least one action during the twenty-four hours.

It is undoubtedly the case that when a patient's digestion is good he can afford to have less frequent actions than can one with a faulty digestion. He may even go for some days without any uncomfort-

able symptoms, but the bad digester, if he does not have relief every day, develops headache, flatulence, a coated tongue, and a general feeling of depression. This, I think, is all a matter of by-products. When digestion is not normal and complete, various substances are formed in the bowels, most likely due to the action of bacteria, which readily get absorbed into the blood-stream, and act as poisons on the organism. If the fæces remain in the bowels too long, they are much more likely to undergo fermentation and putrefaction, and so form these poisonous by-products. The effects of indigestion and faulty action of the bowels play such a large and important part in the general health of the individual that it is a subject not to be neglected, and a regular habit acquired during childhood is generally maintained in after-life.

Certainly the general public is much too fond of taking aperient doses. One has only to notice the huge fortunes made by vendors of liver and aperient pills to appreciate the number sold, this partly because they are advertised as a cure for almost every ailment imaginable, but mainly because there undoubtedly are a very large number of persons who suffer from chronic constipation, especially amongst the population of our great cities. The chief reasons for this are want of exercise, the avoidance of the rougher and coarser articles of food, overloading of the stomach, and the fact that we take the great part of our food in a cooked state.

All aperients should be looked upon as an evil, and not resorted to until attempts have been made to remedy the trouble by regulating the diet, giving exercises, and, if necessary, massage. Constipation also is an evil, and if other methods fail, aperient medicine then becomes the lesser of two, and must be resorted to.

Causes.—1. Some congenital deformity of the intestinal tract.

2. Defective nourishment, the child not getting enough food, as in the case of a breast-fed baby where the mother has not a sufficiency of milk.

3. Faulty nourishment—in milk-fed infants where there is an excess of casein, and not enough fat in the milk, the child not being able to digest the casein; in older children, where the food is too unstimulating, not containing enough débris.

4. Deficiency of fluid.

5. Diminution in intestinal secretion, due to anæmia or other debilitating disease.

6. Too large a quantity of food.

7. Deficiency of bodily exercise.

8. Twisting or strangulation of the bowel, some diseases of the brain and spinal cord, or the presence of worms.

Treatment.—In infants suffering from constipation a change of diet is generally indicated. If it is breast-fed, the mother should take more fruit and other laxative food. In milk-fed children, if the child is not already having it, the addition of barley-

water will often do good; if this fails, a little coarse brown sugar may be tried, or a teaspoonful of Mellin's Food in two or three bottles in the course of the day. It is advisable as soon as possible to get the child into the habit of evacuating its bowels at regular times, and it is a great assistance sometimes to insert a small conical-shaped piece of soap just into the opening of the bowel; this has the effect of stimulating the lower bowel, and causing the child to strain. Should drugs be necessary, a small daily dose of liquid paraffin is one of the most useful and harmless. It acts as an internal lubricant, and at the same time is a mild disinfectant. Failing this, a little manna or fluid magnesia may be given in one of the bottles in the early part of the day. If these prove unsuccessful, nothing further should be tried without medical advice. In the case of older children the diet can be made more stimulating by the addition of fruits, vegetables, and such things as brown bread, oatmeal, etc. A baked apple, or some stewed prunes or figs, eaten before breakfast will often have very salutary effect; the addition to the mid-day meal of more green vegetables in the form of well-cooked cabbage, spinach, lettuce, cauliflower, sprouts, celery, marrow, boiled cucumber, and the like, is also a great aid. It is often wise to prepare such vegetables as cabbage, lettuce, celery, etc., in a purée, and, to add to their laxative effect, a little salad-oil can be mixed in with them. The toast at breakfast and tea can be made of brown bread instead of white,

and Scotch oat-cake can be taken instead of rusks or biscuits, provided there is no gastric irritation.

Children should be allowed to have drinks of cold water between their meals, especially in hot weather, when a good deal of moisture is excreted by the skin, constipation being frequently due to an insufficiency of fluid in the body, so that the secretions from the bowels and liver are not as free as they should be. A cupful of hot or cold water about an hour before meals is very beneficial, care, of course, being taken that it comes from a reliable source. If the water-supply cannot be relied upon, it should always be boiled before it is given to children.

The best treatment for obstinate constipation which cannot be benefited by change of diet is massage and exercises. I have seldom known this fail, even in quite small children, and it is wonderful, when in skilful hands, how quickly they can be taught to do the necessary exercises. These exercises aim mostly at strengthening the abdominal muscles, and during their performance pressing on, and stimulating, the bowels; but they are so regulated as to improve the tone of the entire muscular system. I have seen many obstinate cases entirely cured by this means.

Another very important point is that the child should be taught to go to stool at a regular hour every day. Hurrying off to school immediately after breakfast is the cause of more constipation than anything else, and parents would be wise to

bear this in mind when their children reach the school age, and regulate their breakfast-hour so as to give them a free interval after the meal before rushing off to lessons.

Plenty of outdoor exercise, again, is of great value in combating a sluggish condition of the bowels, and children should be encouraged to roll and tumble about as much as they wish. They are performing Swedish exercises, and giving themselves a certain amount of massage.

Of drugs I will say but little, for they should be used on rare occasions only, and should be regarded merely as a *dernier ressort*.

When there is some offending material in the child's bowels, causing constipation and perhaps stomach-ache, the best remedy is castor-oil; it is very safe and very effective, but unfortunately is apt to constipate after its immediate effect has gone off.

It is necessary here to give a note of warning as to the giving of aperients. Unfortunately it is a not uncommon occurrence for a child to be suddenly seized with pain in the belly, with or without vomiting, due to an irritated or inflamed appendix. In this condition any aperient medicine is highly dangerous, even a dose of castor-oil, which is generally looked upon as such a safe medicine, may convert a mild case into a very serious one. Therefore one is inclined to say that in cases of abdominal pain, especially if there is tenderness on pressure,

there is a decided element of risk in giving an aperient without a doctor's advice. It seems rather absurd because Tommy has eaten a green apple and it has given him a stomach-ache that it should be necessary to send for the doctor; but it is often very difficult to decide, even for the doctor, whether Tommy's pain is due to any serious cause.

In chronic constipation the first medicine that should be tried is liquid paraffin; for a child of five or six years half to one tablespoonful at bedtime, and if this is not sufficient the dose repeated in the morning. This oil, which is quite tasteless and readily taken by children, is not absorbed by the stomach or intestines, but passes right through, thus acting as a mechanical lubricant. It can apparently be given for long periods without any harm. If this should not prove effective, a decoction of senna-pods may be tried. From four to eight pods are put in half a teacupful of cold water in the morning and allowed to soak all day; in the evening the pods are taken out, and the child drinks the liquid, which may be sweetened with a little sugar. An alternative way of giving them is to get the cook to put a few pods in with some stewing prunes, and then to give the child the prunes and juice before or after its breakfast. Other good aperients are cascara, which stimulates the movements of the bowels, and which can be made up into an elixir with saccharine to disguise its bitter taste; magnesia, either the fluid or effervescing citrate; compound

liquorice powder; syrup or confection of senna; and confection of sulphur. Syrup of figs, which is generally a disguised mixture of senna and cascara, is often a convenient and useful aperient.

Rhubarb is a good drug, but it is so extremely nauseous that I think, there being substitutes, giving it is unnecessary brutality. Wherever possible medicines should be made nice for children. If a child gets his first impressions that medicines are nasty, there will be a fuss and bother every time a dose has to be administered; but let the child understand that he is having a treat, and his dose of mixture will be looked forward to.

In the same way it is most important that the doctor should not be held over the child as a sort of bogey-man. Nurses are rather fond of saying to a child, 'If you don't drink this, the doctor will have to come and make you!' or, even worse, perhaps the doctor is represented as coming to amputate the child's thumb because he will suck it, the result being in such a case that when the child is really ill, and maybe a chest examination is necessary, it sets up a howl directly the doctor enters the door, and nothing in the way of an examination can be satisfactorily done. Represent the doctor, whatever his real character, as a glorified Santa Claus, and the child's best friend; then he may be of double the service to you when your child is ill.

Such aperients as grey powder, calomel, etc., should only be given on medical advice, and before

condemning a child to a regular routine of drugs it would be well in all cases to consult a medical man.

As a substitute for drugs, small enemata of cold, or almost cold, water, may sometimes be used with advantage, as may also the injection of a teaspoonful of glycerine, or the introduction of a glycerine suppository. These act most satisfactorily when the trouble is due to an accumulation of fæces in the lower bowel.

CLASSIFICATION OF FOODS

Foods Containing no Unaltered Starch.

Allenbury, No. 1 and No. 2.
Horlick's Malted Milk.
Mellin's Food.
Cheltine Maltose Food.
Hovis Babies' Food, No. 1.
Diastased Farina.
Peptogenic Milk Powder.
Glaxo.

Foods Containing Very Little Unaltered Starch.

Savory and Moore's Food.
Benger's Food.
Allenbury's Malted Food.
Hovis Food, No 2..
Hill's Malted Biscuits.
Allenbury's Diet.
Moseley's Food.
Carnrick's Soluble Food.

Foods Containing a Considerable Proportion of Unaltered Starch.

Scott's Oat Flour.
Chapman's Whole Flour.
Robinson's Groats.
Robinson's Prepared Barley.
Grape-Nuts.
Force.
Falona.
Opmus Food.
Cheltine Infants' Food.
Bananina.
Frame Food diet.
Ridge's Food.
Neave's Food.
Quaker Oats.
Oatmeal porridge.
Nestlé's Milk Food.
Manhu Infant Food.
Coomb's Malted Food.
Nutroa Food.

List of Rusks, Biscuits, etc., Suitable for Children.

Containing but little sugar.

Ordinary baker's rusks.
Tops and bottoms.
German rusks.
Breakfast biscuits.

Hubbard's Rusks (sweet and plain).
Hill's Malted Biscuits.
Nursery Rusks (Huntley and Palmer).
Arrabin's Homburg Rusks (sweet and plain).

Sweet.

Sponge rusks.
Swiss biscuits.
Mellin's Food Biscuits.
Casino (Huntley and Palmer).
Tea rusks.
Rusks made from buns, cake, etc.

TABLE OF FOOD

GIVING AMOUNTS AND VARIETIES FROM BIRTH TO THE THIRD YEAR.

Breast-fed Children.

THE same times of feeding should be observed as with those that are bottle-fed. Weaning should take place at about the tenth month.

Bottle-fed Children.

First Week or Ten Days.—1 to 1½ ounces every two hours.

Remainder of First Month.—1½ to 2 ounces every two to two and a half hours.

Second Month.—2½ to 3 ounces every two and a half hours.

Third to Fifth Month.—3 to 4 ounces every two and a half to three hours.

Sixth to Ninth Month.—4 to 6 ounces every three to three and a half hours.

Tenth Month to One Year.

7 *a.m.*—A feed of 6 to 8 ounces of milk, or whatever milk food the child is taking.

10 *a.m.*—The same, with either a crust to munch, or a piece of some simple biscuit.

1.30 *p.m.*—The yolk of a scalded egg, mixed with some unsweetened biscuit or rusk crumbs, or some mutton, chicken, chicken-giblet, or veal broth, with a crumbled rusk, one or two tablespoonfuls of junket, milk gelatine, or custard-pudding to follow (the custard only to be given on days the child has no egg).

5 *p.m.*—A feed of 6 to 8 ounces of milky food, with a rusk or crust of bread.

9 *p.m.*—Same as above, without the rusk or bread.

One Year to Eighteen Months.

7 *a.m.*—6 to 8 ounces of warm milk.

9 *a.m.*—About 6 ounces of milk, with one or two rusks with butter to eat; occasionally (about twice a week) the yolk of a lightly-cooked egg.

11.30 *a.m.*—4 or 5 ounces of either warm milk or broth.

1.30 *p.m.*—Either of the broths (about 6 or 7 ounces), with crumbled rusk or baked breadcrumbs to thicken it. Some beef-tea soufflé, a scalded egg, or about a tablespoonful of pounded white fish, followed by one or two spoonfuls of a starchless pudding.

5 *p.m.*—Warm milk (6 to 8 ounces), with one or two buttered rusks, crust of bread, or biscuits.

Bedtime.—A drink of milk, or some food free from unaltered starch—Mellin's, Horlick's, or Benger's.

Eighteen Months to Two and a Half Years.

On waking, a small cup of milk.

Breakfast.—The yolk and part of the white of a scalded egg, or a little pounded fish; one or two rusks, or breakfast biscuits with butter; a breakfastcupful of warm milk.

11 *a.m.*—A small cup of either broth, warm milk, or Benger's, Horlick's, or Mellin's Food.

Dinner.—Twice a week a good tablespoonful of well-minced, lightly-cooked mutton; and the other days either minced fish, chicken, pheasant, or rabbit, with a little green vegetable made into a purée, moistened with good gravy or broth. Three or four tablespoonfuls of starchless pudding, with occasionally either a teaspoonful of treacle, a small tablespoonful of the pulp of baked apple, or the same amount of the pulp of well-cooked prunes passed through a sieve.

Tea.—A breakfastcupful of milk, with three or four rusks with butter, giving the last one with some honey or treacle, varying the rusks sometimes with biscuits.

Bedtime.—A drink of milk, Horlick, Benger, or Mellin.

From Two and a Half Years Onwards.

On waking, a drink of milk.

Breakfast.—A large cup of milk. One or two good-sized pieces of crisp toast, with plenty of fresh butter. Either a scalded or lightly-poached egg, some white fish boiled, grilled, baked, or made up into a fish-pie—it is better to avoid fried fish—some cold fat bacon, and occasionally, if it does not disagree, some hot fried bacon. The fat of cold boiled bacon is more digestible than that of hot fried, and it can be spread thickly on a piece of toast instead of butter. A rusk or biscuit may be eaten at the end of the meal if necessary, and occasionally some second day's bread may be substituted for the toast. The meal may be finished up with some fruit, such as a baked apple, mashed banana, or stewed prunes.

11 *a.m.*—A small cup of milk, broth, Mellin, Horlick, or Benger, or some fruit with cream or custard.

Dinner.—Once-cooked mutton, and occasionally the under-cut of sirloin of beef, fish, chicken, pheasant, rabbit, tripe, calf's head or brains, sheep's head or brains, sweetbread, or calf's foot, with some well-cooked green vegetables, such as cauliflower, sprouts, cabbage, spinach, marrow, boiled cucumber, *tender* French beans, or green peas, artichokes, celery, etc. Occasionally a small quantity

of potato that has been well baked in its jacket. A good helping of one of the starchless puddings, and occasionally some ordinary milky pudding such as rice, sago, semolina, or a light and well-cooked suet-pudding, baked or boiled. Water to drink.

Tea.—Two or three pieces of toast or crusty bread, with plenty of fresh butter; some treacle or honey on one piece, followed by rusk, biscuit, and perhaps one or two of the sweetened rusks like the sponge or tea rusks. A large cup of milk.

Bedtime.—A drink of milk, Benger, Mellin, or Horlick.

As the child gets older the amounts may be gradually increased, and red meat may be given rather more frequently. Young children should not be given twice-cooked meats.

When the child can be trusted to masticate well, the meat, chicken, fish, etc., need not be minced, but constipation and other troubles are very apt to arise from meat swallowed down in lumps. Also when the child has thoroughly learned to masticate it may from time to time have some stale bread or simple cake, as a change from its toast and rusks; but if a young and hungry child is given soft bread or cake, it will inevitably bolt it before it becomes thoroughly insalivated.

Sweets and other foods between meals should be prohibited, but a little good chocolate, toffee, or other wholesome sweet may be sometimes given at the end of a meal.

When a child has a tendency to constipation the toast can be made from brown bread; it can also have some wholemeal biscuits or oat-cakes, provided it has no gastric attacks.

To render the toast crisp, it should be put in the oven for a few minutes after toasting, or stood in front of the fire to get thoroughly dry.

Infant Feeding.

The reckoning of food can be estimated by the total amount which should be given in the twenty-four hours.

First Month.—12 to 20 ounces.

Second Month.—20 to 26 ounces.

Third Month.—24 to 30 ounces.

Fourth Month.—30 to 35 ounces.

And later.—35 to 45 ounces.

NOTE.—Two tablespoonfuls go to an ounce, but the tablespoon in ordinary use is a rather large half-ounce.

Night Feeding.

During the first week or ten days food must be given every two hours night and day; after that the intervals at night should be lengthened, so that by the second month the child should go without a feed from 10 p.m. until about 6 a.m.

It will be noticed in the above tables that I have aimed at giving children their starchy food in such

a form that they are obliged to masticate it. This not only aids the digestion of such foods, but teaches the child to masticate thoroughly, which once learned is not readily forgotten. I point this out again, because I feel it cannot be too frequently mentioned. It is the text of my theme, and in my belief the most important point in the feeding of children.

Children and adults who masticate well are much less likely to overeat themselves, and so suffer from gastric distension.

In the diets given above it may sometimes be better to give not more than a teacupful of milk at breakfast and tea, increasing the quantity given on waking, at 11 a.m., and at bedtime. Digestions, when not very strong, manage solid food with more ease when not mixed with too much fluid.

RECIPES

I HAVE included in these recipes various foods and suggestions useful in the feeding of children—foods which depend for their digestibility on their cooking, and about which I find a great many people are quite ignorant. I refer to such things as sheep's head, calf's tail, ox palate, etc. These, if properly cooked, are most easily digested foods, but when badly cooked are almost uneatable. Then again, in the cooking of fish, most people limit their energies to boiling and frying; children and invalids, who are not fish lovers, easily tire of these, and as fish is such a valuable food it is useful to have other methods to try. I have often found that children who are not fond of fish can be tempted to eat even a boiled whiting by adding bread-sauce to the meal. This by most people is reserved for roast fowl and turkey, but it makes an excellent adjunct to fish. Again with rabbit, this generally is sent up to table boiled and covered with white sauce, making rather an insipid and uninteresting dish. There are various other and tastier modes of cooking than this, one of which is to cut up and put into a casserole with a little bacon and cut-up egg, much like a rabbit-pie

without the pastry. Care should always be taken to obtain a young rabbit, avoiding if possible any that have been trapped. Another useful hint is occasionally to allow a child rather more savoury food, such as cod's-roe or fresh herring or bloater's-roe. This is quite a nourishing and easily digested food, and generally liked. In the case of cod's-roe it can be given alone, boiled, or if added to a fish cream or soufflé, will add much to the savour. A small amount of such dainties judiciously given acts as a stimulant to appetite.

The following is a list of puddings (1) containing no starch, and (2) containing very little starch:

(1) *Containing no Starch.*

Baked custard.
Boiled custard.
Steamed custard.
Junket.
Milk gelatine.
Coffee mould.
Chocolate mould.
Omelette.
Vanilla sponge.
Lemon sponge.
Calf's-foot jelly.
Caramel pudding.
American mould.
Apple soufflé.
Prune shape.
Egg jelly.
Ribbon mould.
Prune soufflé.
Abbot's delight.

(2) *Containing little Starch.*

Grape-Nut pudding.
Rice soufflé.
Rusks and calf's-foot jelly.
Grape-Nut jelly.
Rusk pudding.

Rusk Making.—From *stale* buns or fancy bread. Cut slices downwards, put on a baking-sheet in a slow oven, occasionally turning them for a quarter of an hour. Cool on a sieve. Keep in a closed tin.

Pulled Bread.—Take a *new* loaf of bread still warm. The bottom half of a cottage loaf makes ½ pound. Remove the crust preferably. Pull to pieces, not too thick, lay out on a baking-sheet loosely, bake in a moderate oven for two hours or so. Cool on a sieve.

Baked Custard.—One pint of milk, three eggs and a little sugar; beat the eggs all together, and add the milk gradually whilst stirring. Bake for half an hour.

Boiled Custard.—Half a pint of milk is put in a saucepan with a cover, this being placed in another saucepan with water. Bring the water and milk to the boil. Beat two eggs well together, and add them to the milk, with a little sugar, after it has boiled; reheat, but do not boil, then put the milk saucepan into cold water, and stir until the mixture is cool enough to pour into glasses.

Steamed Custard.—Beat two eggs together, add ½ pint of milk, and beat well; pour this into a basin and stand in a saucepan of water; steam for half an hour; turn out, and serve hot or cold. A simple sauce or a little cream is a great addition.

Custards for Soups.—One egg, ¼ pint of milk. Beat up egg whole and a little salt, add cold milk;

beat together, pour into shallow pie-dish, lay this dish in the steamer, and steam twenty minutes (or put dish in a saucepan containing some water). Cut up and serve.

Junket.—Warm 1 quart of milk, remove it from the fire and add to it a spoonful of Lorrimer's Rennet Powder, or other rennet, such as Benger's Essence of Rennet, stirring gently; pour it into a dish and set aside to cool, when a firm junket will be formed.

Milk Gelatine or Blancmange.—Soak ¼ ounce of gelatine in ½ pint of cold milk for about two hours, then put them into a saucepan and bring to the boil, adding two lumps of sugar; strain into a mould and cool.

Coffee Mould.—Made in the same way as the milk gelatine, but 1 gill of previously made coffee is added after the milk and gelatine have boiled. This requires rather more sugar than the milk gelatine.

Chocolate Mould.—Two ounces of finely-grated chocolate are mixed with 1 pint of cold milk; this is put into a saucepan and gently warmed to dissolve the chocolate; ½ ounce of soaked gelatine is then added, and when dissolved the whole is brought to the boil, strained into a mould, and allowed to cool.

Another Recipe, with Eggs.—Heat 1 pint of milk, beat the yolk of two eggs, and add the hot milk to them; put on the fire and stir all the time until nearly boiling; add gradually 2 ounces of grated

chocolate, and stir until dissolved, then add ½ ounce of soaked gelatine to the mixture, allow it to heat for a few minutes and stir, then strain it into a mould and allow to cool.

Plain Omelette.—Break two eggs into a basin (add a little chopped parsley if liked), add a piece of butter the size of a walnut, beat up with a fork; then add two and a half tablespoonfuls of milk (or two tablespoonfuls and a little cream), and beat again. Have some melted butter in a pan very hot, pour the mixture into this, and stir with a spoon all the time over a very hot fire. Push this to the side of the pan, turn up the edges a little, and turn out on to a warmed dish.

Egg Froth.—Separate the *white* from the yolk, put it in a basin, whisk to a froth, put on the top of any light pudding, etc., stand this for a few seconds in the oven, or touch it with a hot salamander.

Vanilla Sponge.—Soak ¼ ounce of gelatine in a little cold milk; bring ½ pint of milk to the boil, and when taken off the fire add the soaked gelatine, a little sugar, and vanilla, or other flavouring; turn out in a basin and cool, then add the white of one egg, well beaten, and beat all well up together; pour into a mould and turn out.

Lemon Sponge.—Soak ¼ ounce of gelatine in ½ pint of cold water for two hours, then dissolve it by adding ½ pint of boiling water; stir until the gelatine is lost sight of. Beat together the whites of two

eggs, 2 ounces of castor sugar, and the juice of two lemons, gradually adding the gelatine and water, and then beat for forty minutes. Rinse a china mould with cold water, pour the snow in, and let it stand until next day. Make a custard with the yolks of the eggs and ½ pint of milk, flavouring with lemon-peel.

Lemon Snow is the same as above, but turned on to a dish instead of into a mould.

Calf's-Foot Jelly.—Take one calf's foot, break it up well, and put it into 1 quart of water; bring it to the boil, and then skim it clean. Boil the whole very gently for two hours, by which time there will be only about half the fluid left; now strain through a hair-sieve and allow to get cold, remove the fat, add sugar, lemon, or any other flavouring to taste, also the beaten white of one egg, and return to the saucepan. Whisk this over the fire until it comes to the boil, then set well to the side of the fire to simmer for an hour, when the froth will rise. Strain through a jelly-bag into a mould, and allow it to set.

Caramel Pudding.—Put six lumps of sugar in water in a saucepan, and boil for about ten minutes, until well browned. Put this into a cake-tin and allow it to get cold. Beat up two eggs together, then add ½ pint of cold milk and a little white sugar; pour this into the mould, and steam very slowly for one and a quarter hours. Turn out and serve hot or cold, with the liquid caramel forming

the sauce. The hard caramel on the top, if any has formed, should be removed.

American Mould.—One pint of milk, two eggs, and a little castor sugar. Heat the milk, separate the whites from the yolks of the eggs, put the yolks in a basin, and pour over them the hot milk, stirring well. Put this back into the saucepan, and stir slightly to remove the rawness; add to this 1 ounce of gelatine, previously soaked in cold water. When dissolved by stirring, remove from the fire, and put in a basin until nearly set. Beat the whites of the eggs to a stiff froth, put this to the mixture, and beat all together until stiff. Put this into a wet mould, with or without flavouring, and turn out when cold.

Ribbon Mould.—Soak ½ ounce of sheet gelatine in cold water for about twenty minutes. When soft take them out and put in a saucepan with 1 pint of cold milk, 2 lumps of sugar. Stand this on top of the stove; and keep stirring until dissolved, but do *not* let it actually boil. Strain through a strainer into a basin, and add small teaspoonful of vanilla. Divide this now into three or four portions in separate basins or cups. Flavour each one differently, either with a little melted and strained jam, cochineal, coffee, or a yolk of egg, to make varying colours and flavours. One layer can be left plain white and another all chocolate, by grating about a dessertspoonful and putting into a saucepan with a little water, melted over the fire, mixed to a

paste, and then added to the gelatine. One layer must then be poured into a china mould, and when set another layer added, and as many as are wished.

Prune Soufflé.—About three French plums for each person; the whites of two eggs to every eighteen plums, or if the plums are large, to every fourteen plums. Put the plums in a small basin with sufficient water to moisten them all; cover the basin and put it into the oven until the plums are quite tender. Cool the plums and cut each into about six pieces, removing the stone. Put the stones in the liquor and bring to the boil in a saucepan, adding a piece of butter the size of a walnut; then strain off and add two small tablespoonfuls of sugar, boil to a syrup, and when cold add the plums and the whites of egg, beaten to the stiffest froth, mix thoroughly until the whites are brown. Pour the mixture into a buttered soufflé dish, and bake in a quick oven for about ten minutes. This can be served with cream or whipped cream, flavoured with vanilla.

Apricot or apple soufflé can be made the same way.

Prune Shape.—Put about ½ pound of French plums in a saucepan, pour on them 1 pint of cold water, adding about 2 ounces of brown sugar; boil gently until quite tender, about three hours or more. Strain the liquor off, remove the stones from the plums, and rub through a fine sieve; put the liquor

back in the saucepan and add ½ ounce of soaked gelatine, put it over the fire and stir until dissolved. Put the sieved prunes in a mould and slowly mix in the liquor; turn out when cold. If any of the liquor remains, chop it up when cold and jellied, and decorate the dish with it.

Egg Jelly.—Put ¼ ounce of gelatine, 2 ounces of loaf sugar, and a gill of water into a saucepan; add the thin peel of one lemon, strain the juice of a lemon, and add enough water to it to make 1 gill; add this and a well-beaten egg to the contents of the saucepan; stir over moderate heat until the gelatine is dissolved, then strain into prepared moulds.

Abbot's Delight.—Soak ¾ ounce of gelatine in ½ pint of cold water; boil 4 ounces of white sugar in 1 pint of milk, adding the gelatine while boiling; pour this to the well-beaten yolks of four eggs. Pour into a mould to cool.

Sauce for the Above.—The juice of two good-sized lemons, the rind of one cut very fine, 6 ounces of fine white sugar; set on the hob to dissolve.

Rusk Pudding.—Five or six rusks, ¾ pint of boiling milk, 2 eggs, sugar to taste. Butter a small basin or mould, lay the rusks in; pour the boiling milk on the eggs (well beaten before), strain them over the rusks, cover with a buttered paper, and steam for twenty minutes. Serve with soft custard or wine sauce. Can also be baked.

Grape-Nut Pudding.—Put one and a half dessert-

spoonfuls of Grape-Nuts into a basin with a little boiling milk, and let it soak for an hour, then beat it up with a fork, add a well-beaten egg, and beat well together; add the remainder of half a pint of boiling milk, beat again, then put in a pie-dish and bake for an hour; put a little butter and sugar on the top.

Another Recipe.—Boil sufficient Grape-Nuts with milk to the consistency of thin porridge, and add a dessertspoonful of butter and sugar to taste. The quantity must fill two-thirds of the dish. Separate the yolks and whites of two eggs and whip each well, add first the yolks and then the whites to the Grape-Nut mixture, and flavour with vanilla, cinnamon, nutmeg, or, if preferred, nothing. Bake in a quick oven in a soufflé dish.

The whites of eggs should always be whipped to the stiffest froth for any milk pudding, and then mixed thoroughly with the boiled mixture: this prevents the custard from rising to the top of the dish, and makes a deliciously light pudding; always add half a small teaspoonful of salt.

Plasmon.—Two or three teaspoonfuls of Plasmon can be added to any of these puddings to make them more nourishing.

Rice Soufflé.—Boil a tablespoonful of rice in ½ pint of milk for half an hour, add more milk if needed, mix a teaspoonful of flour with a little cold milk, add to the rice and boil for a minute or two. Take it from the fire and let it cool a little, mix with

it the well-beaten yolk of one egg, a little brown sugar, and flavouring, then add the white of the egg, beaten to a stiff froth, mix lightly; put in a pie-dish and bake for half an hour.

Grape-Nut Jelly.—Half a pint of milk, one heaped teaspoonful of Grape-Nuts, one lump of sugar, about 2 ounces of gelatine. Bring the milk to the boil, add this to the Grape-Nuts in a basin, let stand for about five minutes, beat up with a fork, replace in the saucepan, simmer for one and a quarter hours at the side of the stove. Put in the sugar and gelatine, previously soaked, stir whilst on the fire till thoroughly mixed, pass through a hair-sieve into a mould and set.

Rusks and Jelly.—Take six or eight plain rusks, or four stale sponge-cakes, cut into slices, and arrange in a dish; make 1 pint of calf's-foot jelly, flavoured with lemon, and when quite hot pour it over the rusks or sponge-cakes; stand this where it will keep hot for a short time, so that the rusks or sponge-cakes may get thoroughly soaked with the liquid, then allow to cool. When the jelly has formed, a little well-whipped cream or custard can be put over it. This can be flavoured with a little orange or lemon juice if tolerated.

Lemon Cheese-Cake.—Beat up one egg and add to it a little sugar or saccharine, then mix in the juice of one lemon and a teaspoonful of liquid Plasmon which has been made pretty thick. Stand the mixture in a saucepan of boiling water and stir until it

thickens. Do not let it boil. When cooked beat up well and serve it with any plain pudding, such as the milk gelatine, or spread on rusk; or can be made with orange.

Baked Suet.—Quarter-pound suet, 6 ounces flour, teaspoonful baking-powder. Mix baking-powder with flour, thoroughly chop the suet up *very small*, mix all together. Mix in gradually a teacupful of milk and water. Grease a small pie-dish with butter, put in the mixture, and bake for one and a half hours.

Raw Meat-Juice.—Take ¼ pound of raw lean steak, which should be fresh, chop and pound it well, and pour on it four tablespoonfuls of cold water. Allow this to stand for one hour, at the end of which time pound it again; put it in fine muslin—at least two folds—and squeeze out the juice. This does not keep well; it should therefore never be left in a warm room, and should be made at least once in six hours, especially during warm weather.

Beef-Tea Custard.—A valuable, stimulating and nourishing food for children. Take the yolks of three eggs and the whites of two, beat them up separately and then together, mix them with a ¼ pint of strong beef-tea, pour into egg-cups or glasses, and stand them in hot water until set.

Beef-Tea.—Take 1 pound of lean beef, chop it up into small pieces, and put it into a jar with a pint of water and a little salt; cover it with parchment

paper and stand it in a saucepan of water, allowing it to simmer for two hours, heating gradually at first; the amount of 1 pint should be maintained by the addition of more water. Instead of simmering in a saucepan of water, the jar can be put in the oven and kept there for two hours.

Beef-Tea (another method, French). — Take 3 ounces of lean beefsteak and cut into small dice. Take a breakfast-cup and put on the top of it a colander or potato-mash, in this place the diced meat, which, with a wooden spoon, press and rub, whilst pouring *slowly* over it a little boiling water from a kettle. When the cup is three-quarters full, place it in a saucepan of boiling water over the fire for ten minutes. This should be made fresh each time, as it does not keep well.

Three-Meat Broth (*or Jelly*).—Take ½ pound of gravy beef, neck of mutton, and knuckle of veal. Simmer them slowly in 1½ pints of water for three to four hours, adding a little water from time to time to keep up the amount. Allow it to cool to remove fat, and it can then be served cold as a jelly or as hot broth. If not required quite plain, some vegetables and flavouring can be added.

Veal and Milk Broth.—One pound of knuckle of veal, some chopped vegetables in a muslin bag, 1 pint of milk, and ½ pint of water. Stew this slowly for two hours on a moderately hot stove. Then remove the bag of vegetables, thicken with prepared barley, and simmer again for about fifteen minutes.

This is a very nourishing broth, containing the milk and barley besides the veal extracts.

Giblet and Veal Broth.—Get sixpennyworth of giblets and a knuckle of veal. Wash the giblets in cold water. Put 1 quart of hot water in saucepan, and, after removing all fat from the veal, put it, together with giblets, into this and simmer slowly all day, never allowing the water to boil away. When sufficiently done, strain off the meat and giblets, putting the soup back into the saucepan. Add one pinch of salt, also white of egg and shells to clear. Pass through a jelly-bag, and let it stand to get cold, when it should be in a thick jelly.

Fish Soup.—Put a fresh haddock into a stewpan, with milk just enough to cover it, and a little salt. When it boils let it simmer for an hour, strain it, and take out the fish. Put the stock back in the saucepan, and thicken with two teaspoonfuls of ground rice and a few pieces of the fish rubbed down into a powder; a little finely-chopped parsley can be added.

Giblet Broth.—Scald and skin the feet, empty the gizzard, scald and skin it, break up somewhat the neck and legs, put these in salt and cold water. Let soak for half an hour. Then put these in a saucepan or Challis boiler with ½ pint of cold water (this quantity for giblets of one fowl; 1 pint of water to threepennyworth of bought giblets). Put at the *side* of the stove, and let simmer for four or

five hours. Strain whilst hot in a basin, and let stand, to remove fat, till next day.

Scalded Egg.—Boil 1 pint of water in a quart saucepan. When boiling put in the egg and immediately remove it from the fire, standing it at the side for five minutes; this cooks it very lightly, and should make the white creamy and not set—the best way of cooking eggs for children.

Fish Scollop.—From cold boiled fish or sieved fresh fish. Break up the fish, add a little salt and milk, put into a china scollop; add a few bread-crumbs, and bake.

Fish Cakes or Rissoles.—Same, only formed into balls, etc.

Fish Omelette.—The same, but mixed with the usual ingredients of an ordinary omelette.

Fish Cream.—Sieved fish and a whole egg and a little milk in a basin, steamed.

Fish Soufflé.—Same, only beaten up with milk and a yolk, and a *beaten white* of egg, put into soufflé-dish into oven for twenty minutes.

Fish in Own Gravy.—A white fish (stuffed if liked) put on a baking-sheet with a little butter or dripping, place in oven, baste it well; serve in its own liquor, thickened a little if liked.

Cream of Whiting.—Take the raw fillets of a whiting, being careful to extract all the bones, chop and well pound it until it is a fine pulp; measure this with a spoon and put it into a jar with an equal number of spoonfuls of milk and a little salt, mixing

well together. Tie greased paper over the jar, place in a saucepan of boiling water, and steam for thirty minutes.

Calf's Tail.—Wash in salt and water once or twice. Cut up at the joints, put with a pint of cold water into a casserole, with a little salt, and mixed herbs if liked. Place in the oven for seven hours or so. Mix about a dessertspoonful of flour with water, add this to the rest, cooking a further quarter of an hour. Serve hot, or may be eaten as a cold jelly.

Ox Palate.—Wash in salt and water several times, put into a saucepan with cold water and a little salt, bring to the boil; then put at the side on top of stove and let stand to *simmer*, not boil, for six hours. Remove, skin it, and cut into pieces, put with a little gravy and some of its own liquor into a casserole, cover, put in the oven to cook slowly for six hours, turning it round at intervals. Mix a teaspoonful of flour with a little water, add this to the gravy; put all back into the oven for a quarter of an hour. Serve hot, or can be eaten as cold jelly. As the palate does not keep well uncooked, it is well not to have it in long beforehand.

Sheep's Head.—Take out the brains and cook these separately; soak the head in fresh cold salt water for one and a half hours. Clean thoroughly in more salt and water, cutting away all unnecessary pieces. Put into a saucepan with cold water enough to cover, with salt about the size of a walnut; put lid on. Bring gradually to the boil on top of

the fire (removing the scum as it rises) for about an hour. When it has come to the boil put the pan to the back of the range to simmer gently for two and a half hours. Separate the meat from the bones, which should now be done easily. Put the meat on to a hot dish, remove any fat from the gravy, pour over and serve. The tongue can be left in the head or cooked separately. The brains can be made into a *sauce*, or *fried* and served with the meat. If a curry is wanted, cut up the meat and curry for a few minutes.

Sheep's Brains.—Wash a pair of sheep's brains under the tap; put them into a saucepan of boiling water for about ten minutes to one quarter of an hour. Take out, and put on a plate to cool, turning over to cool both sides. Then beat up a whole egg in a cup, and with a wooden spoon put each brain in this, doing each one separately, and then take it out of the egg and lay each in paper in which breadcrumbs have been put; shake about gently to cover properly. Then put them into an omelette-pan of boiling dripping, and carefully fry them over a good fire, turning them over when one side is done. Take out with a fork, and serve hot.

If stewed, clean them, then boil and skin, add good gravy, and stew half an hour.

Chicken Panada.—Cut up part of the breast of a fowl, put into a large jam-pot, cover with paper, in which prick a few holes with a fork. Place this in a saucepan half full of cold water, which should come

nearly up to the top of the outside of the jam-pot. Fit the lid of the saucepan tightly on, and let it simmer very quietly all day. Pour off the small quantity of liquid which is extracted from the meat, and let it stand for the film of fat to rise and be removed. Take the meat and pound in a mortar whilst warm, run it through a fine sieve into the liquid, and add a little salt or very delicate flavouring. The consistency should be about that of cooked arrowroot.

Fowl (in casserole).—Joint a fowl, put all the pieces in a casserole with 1 pint cold water, put lid on, and place in oven for one and a half hours. Then add a little salt and uncooked bacon; continue cooking for about one hour.

Fowl (cooking small portions at a time).—Cut off pieces from the breast and wing, lay these in a pie-dish, and cover up, or between two saucers. Put into a steamer and steam one hour. Serve in its own liquor.

Beef-tea Soufflé.—The yolks of two eggs and the white of one, ¼ pint of strong beef-tea. Put into the oven a round tin or pie-dish well buttered. Beat the eggs well, adding a little salt and pepper. Warm the beef-tea and add it to the eggs whilst beating. Pour the mixture into the tin, and bake in a quick oven for twenty minutes.

Humanized Milk.—Take 1 pint of fresh cow's milk and allow it to stand for the cream to rise; separate this. Now warm the skimmed milk, and

add to it a teaspoonful of essence of rennet; stand on one side until the curd has well set. When set, break up the curd with a fork, and strain the whey off through muslin; mix the whey and previously separated cream together, adding to them ½ ounce of sugar-of-milk, then mix this with a pint of fresh cow's milk. Sterilize the whole, either by boiling or, better still, in a proper sterilizer, and the humanized milk is ready for the child.

If this is too heavy, containing rather too much casein, less than a pint of fresh milk can be added to the whey and cream; if, on the other hand, it is required stronger, more than a pint can be added.

If the milk is too rich in cream, some of that first separated can be rejected; or, on the other hand, more if desired can be added. The added sugar-of-milk can also be varied as required.

The first mixture should almost exactly resemble human milk in its composition.

Bread Jelly.—Four ounces of bread, two or three days old, is soaked in a basin of cold water for eight hours; it is then removed, the water pressed out of it and thrown away, the object of this first soaking being to dissolve out any lactic acid or other injurious matter.

The pulp is then placed in a pint of fresh water, and gently boiled for an hour and a half, which has the effect of thoroughly breaking up the starch granules, and dextrinizing them. The thick gruel is then strained and rubbed through a fine hair-

sieve, when on cooling it forms a fine jelly. One teaspoonful of this to 2 ounces of water, with the addition of a little white sugar, is about the strength to administer to a child of two or three months old. It should be prepared at least twice a day.

Albumen Water.—The white of one egg is mixed, not beaten up, with 3 ounces (six tablespoonfuls) of cold boiled water, and then strained through fine muslin. To heat it must be stood in warm water, about 100° F. (if too hot it will coagulate the albumen). For a child of a month, two or three tablespoonfuls should be given every hour and a half.

Barley-Water.—One teaspoonful of Robinson's Prepared Barley stirred into a paste with a little cold water; add this to a pint of water, and boil for fifteen minutes. This, as a rule, is thick enough to add to a baby's milk, but for older children, if the barley-water is required thicker, two teaspoonfuls can be used.

Barley-water does not keep very well, and should be made at least twice in the twenty-four hours; but for sick babies, especially in hot weather, it is better to have it made once every six hours. This is a purer and cleaner-looking barley-water than that made from the ordinary pearl barley, which also requires a great deal more boiling.

Barley-Water (another recipe).—Take three teaspoonfuls of pearl barley, let it stand for half an hour in cold water, then wash it in relays of hot water until the water used looks quite clean. Put it into

a pint of cold water, bring to the boil, and allow it to boil for three minutes. Throw away this water, add a fresh pint of cold water, bring it to the boil, and allow it to simmer slowly for thirty minutes, stirring occasionally. Strain through fine muslin, having previously added sugar and lemon-juice to taste.

Oatmeal Water.—A pleasant drink for children or adults in hot weather. Put two tablespoonfuls of coarse oatmeal into a stewpan with 3 quarts of cold water, stir well and boil for five minutes; squeeze the juice of two lemons and pare the rind of one into a basin; strain the water off the oatmeal into the basin through muslin, and add sugar as required.

White Wine Whey.—A small glass of sherry is added to ½ pint of fresh milk, which has the effect of curdling it; this is allowed to stand for twenty minutes, and the whey is then strained off through muslin.

Whey is usually made not as above, but by making a junket (which see), breaking it up, and then straining off the liquid through muslin.

Lime-Water.—Take a saltspoonful of freshly-slaked lime and stir it thoroughly into a pint of boiled and filtered water; let it stand for two hours, and then very carefully pour off the clear lime-water, leaving the sediment at the bottom undisturbed. This lime-water should be put in a well-stoppered bottle, and can be safely kept for some weeks.

Malted Gruel.—A heaped teaspoonful of either flour, Robinson's Prepared Barley, medium or fine oatmeal, or ground rice, or double that quantity of crushed wheat, pearl barley, crushed oats or whole rice, is added to a pint of water, and boiled for half an hour. It is always better to use a double boiler, as it does away with the risk of burning. At the end of the half-hour the vessel is stood in cold water, until the gruel is cool enough to be tasted, when a teaspoonful of extract of malt is added and stirred (this causes a decided thinning of the gruel); when quite cool it should be strained through muslin and a little salt added to it. If it cannot be kept in a cool place, under 60° F., it should be pasteurized by bringing it up to the boil. There are many reliable malt extracts on the market, amongst which I would mention Allen and Hanbury's, Kepler's, and that of the General Apothecaries' Company.

Curded Milk.—Make a junket with ½ pint of milk; as soon as it has well set break up the curd with a fork, and pour it into a bottle. Shake this very thoroughly for some minutes, until the curd is so finely broken up that the fluid looks like ordinary milk. It should be drunk soon after making.

To make a lighter drink of it, a little barley-water can be added and shaken with it in the bottle. It is better before making the junket to bring the milk to the boil; the curd will be softer and more digestible. Orange or lemon juice may be added to this to make it more palatable to a child who dislikes milk.

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